

Diagnostic Scanner

Convex/Linear Ultrasonic Scanner

HS-2100V

Our unique technology is the product of our originality and continual pursuance of achieving high quality. It is also our purpose to contribute in ways that will enhance society.

Instruction for Use

Please read this Manual carefully before you operate this ultrasonic scanner for safe and proper operation.

Do not operate using other method than those specified in this manual.

Keep Manual in a place you can access easily when operating this instrument.

In case of the loss of this manual, contact your local distributor.



HONDA ELECTRONICS CO.,LTD.

ABOUT THE SYSTEM

The HS-2100V system is a general-purpose ultrasound diagnostic system used for internal medicine, obstetrics, gynecology, pediatrics and so on.
It is used to acquire and display gray scale B mode image and M mode image.

ABOUT THIS MANUAL

Thank you very much for purchasing our medical ultrasound diagnostic equipment, HS-2100V. HS-2100V is the ultrasound diagnostic equipment with high performance functions and compact size that provides the following features.

- ◆ Wide selection of probes (including high-sensitivity Convex and Linear) enabling diagnosis in various fields.
- ◆ Compact size with foldable keyboard
- ◆ Portable and space saving
- ◆ Multiple image control functions enable to obtain high quality image.
- ◆ The 10.4 inch color LCD monitor provides clear images.
- ◆ Trackball and easy-operating key layout enabling efficient diagnosis and measurement.
- ◆ Enriched diagnostic programs
- ◆ Extensive measuring functions that can be used in a wide range of applications, such as abdominal and obstetrical examinations.

NOTE

- For the safety of patients and users and the full use of HS-2100V, read this manual thoroughly before starting the examination.
- The use of the software is restricted to the examination and diagnosis with HS-2100V. It may be copied only in accordance with the terms of agreement.
- No part of this manual may be reproduced in any form without the express permission of the copyright owner.
- The contents of this manual are subject to change without notice.

Safety Classifications

The HS-2100V has the following safety classifications.

- Impact protection classification based on model type.
Class I
- Impact protection classification based on level of protection.
BF type installed part
- Precautions for ingress of liquids
The enclosure for this equipment offers no protection against the ingress of liquids.
- Precautions about use in combustible environments
This equipment is not suitable for use in environments where air and combustible anesthetic gases or oxygen/ nitrous oxide and combustible anesthetic gases are used

IMPORTANT PRECAUTIONS FOR SAFETY

This instruction manual adopts the following symbols and words. These symbols and words are intended to operate HS-2100V safely and to prevent risks and damages to property from occurring.

Understand the meanings of these symbols and words thoroughly before reading this instruction manual.



If HS-2100V is handled improperly without following DANGER mark, the possibility to cause death or serious injury of patient and user might increase.



If HS-2100V is handled improperly without following WARNING mark, it could cause serious injury or death of patient and user.



If HS-2100V is handled improperly without following CAUTION mark, it could cause personal injury or property damage.



This mark indicates supplemental descriptions and hints for using HS-2100V.

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..MEMO..

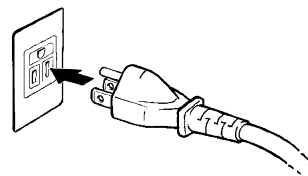
CHAPTER 1 GENERAL DESCRIPTIONS

This chapter describes the safety precautions, outlines of the system, and basic operating method for HS-2100V.

Be sure to read this chapter thoroughly before using HS-2100V.

1.1 PRECAUTIONS

- The power cable should be connected to the ground without fail when operating this equipment. Failure to do so could cause electrical shocks.



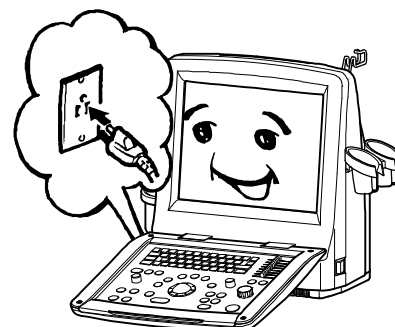
DANGER

- This equipment should not be disassembled excepted by authorized persons since this equipment includes high voltage. Failure to do so could cause electrical shocks.



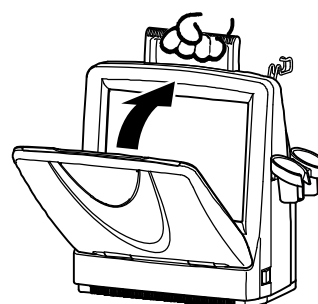
DANGER

- The power cable should be connected to specified power outlets properly. Failure to do so could cause heating or smoking.



WARNING

- The grip mounted at the top of this equipment should be held after closing the front panel and holding the probe in the probe holder when carrying.

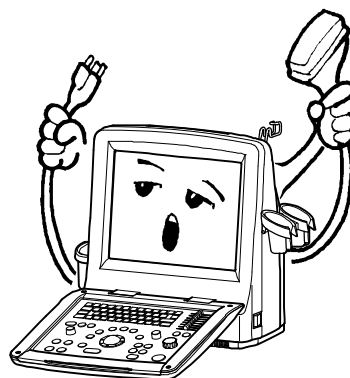


CAUTION

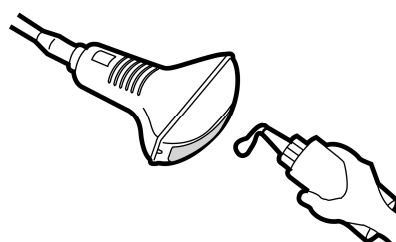
- This equipment should not be used under moist atmospheres and places that could get the water splash such as under transfusion stands, etc. If not handled properly, it will cause failure of this equipment.



- The abnormality and damage in the main body and accessories used in this equipment should be inspected before each use. Extra special care must be taken on the attaching parts of the probes and power cables. If damage is detected, stop operating immediately, and replace the damaged part with new parts.



- Before starting examination, the ultrasound transmission gel should be evenly applied to the probe or the portion to be examined. Only use the ultrasonic gel designated by Honda Electronics. The use of other undesignated ultrasonic gels could cause deterioration of the probe.



- This equipment should not be used near the device (medical telemeter, cordless telephone, etc.) that generates the electromagnetic noise and radio-frequency.



- The probes should be handled with special care.
(The function will work improperly if the probes are fallen and applied impact.)
In addition, never pull on the probe cable.



- The mechanism used to hold the keyboard in the closed position has magnets. Do not place IC cards, magnetic cards or other such objects near these magnets. This could result in damage to these objects,



- Only attach/remove the probes when the power is off. If the probe is attached/ removed with the power on, it will not be properly recognized by the unit. In addition, it could also result in damage to the probe.

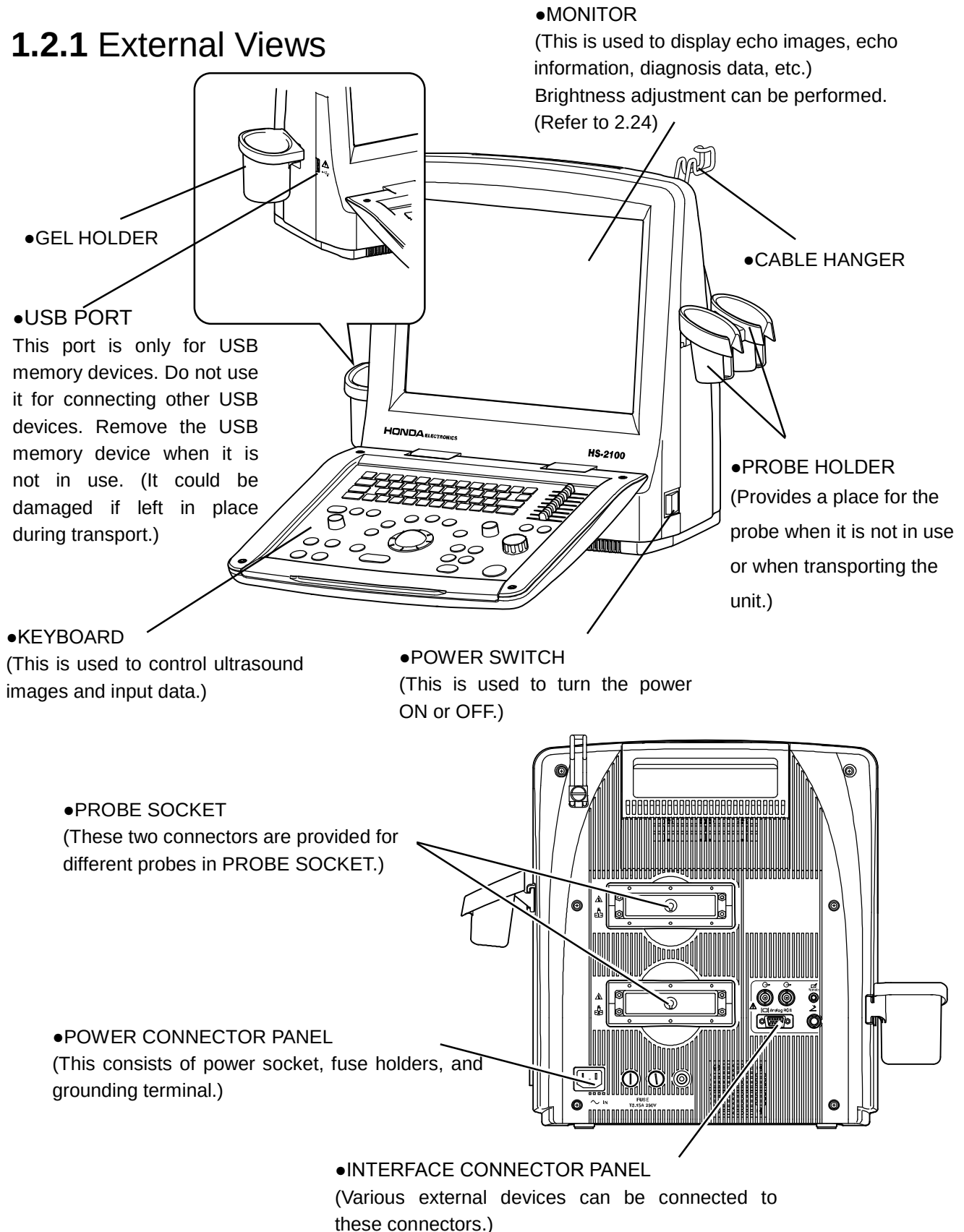


[Other Precautions]

- This equipment is only for medical use. Never use for any other purpose. The equipment should not be used by non-qualified person.
- In order to avoid unnecessary exposure to ultrasound output, keep the time used for making diagnosis to an absolute minimum. Keep the time used for acquiring data for examination to an absolute minimum.
- Never use this device for diagnosis during surgery.
- Never allow this unit to come in contact with anything other than human skin. Never use on the eyes or other such areas as it can damage the surface and inner parts of the eyes.
- Never touch this device or its peripheral components with wet hands.
- This equipment should not be used in the place that could cause explosion and around combustible material.
- Never use this unit in areas where there are volatile solvents.
- Never use a probe other than the one provided with this unit.
- Always use the designated devices when connecting this unit to peripheral equipment. Failure to use the designated devices is dangerous as the safety of this unit as a medical device cannot be ensured.
- Always use the power supply cord provided. Never use a cord other than the designated cord as this is dangerous and could cause an accident.
- Always check that the unit is functioning properly and that the patient feels no abnormalities. If an abnormality is detected, take the necessary procedures such as immediately stopping the unit and giving assistance to the patient.
- If failure occurs, attach the indication to alert caution properly. Do not touch this equipment. Contact your dealer for inspection and repair.
- Never attempt to modify the main unit or the probe.
- The safety precautions described in this manual and the instruction manual attached to this equipment should be completely followed.

1.2 NAMES AND FUNCTIONS OF COMPONENTS

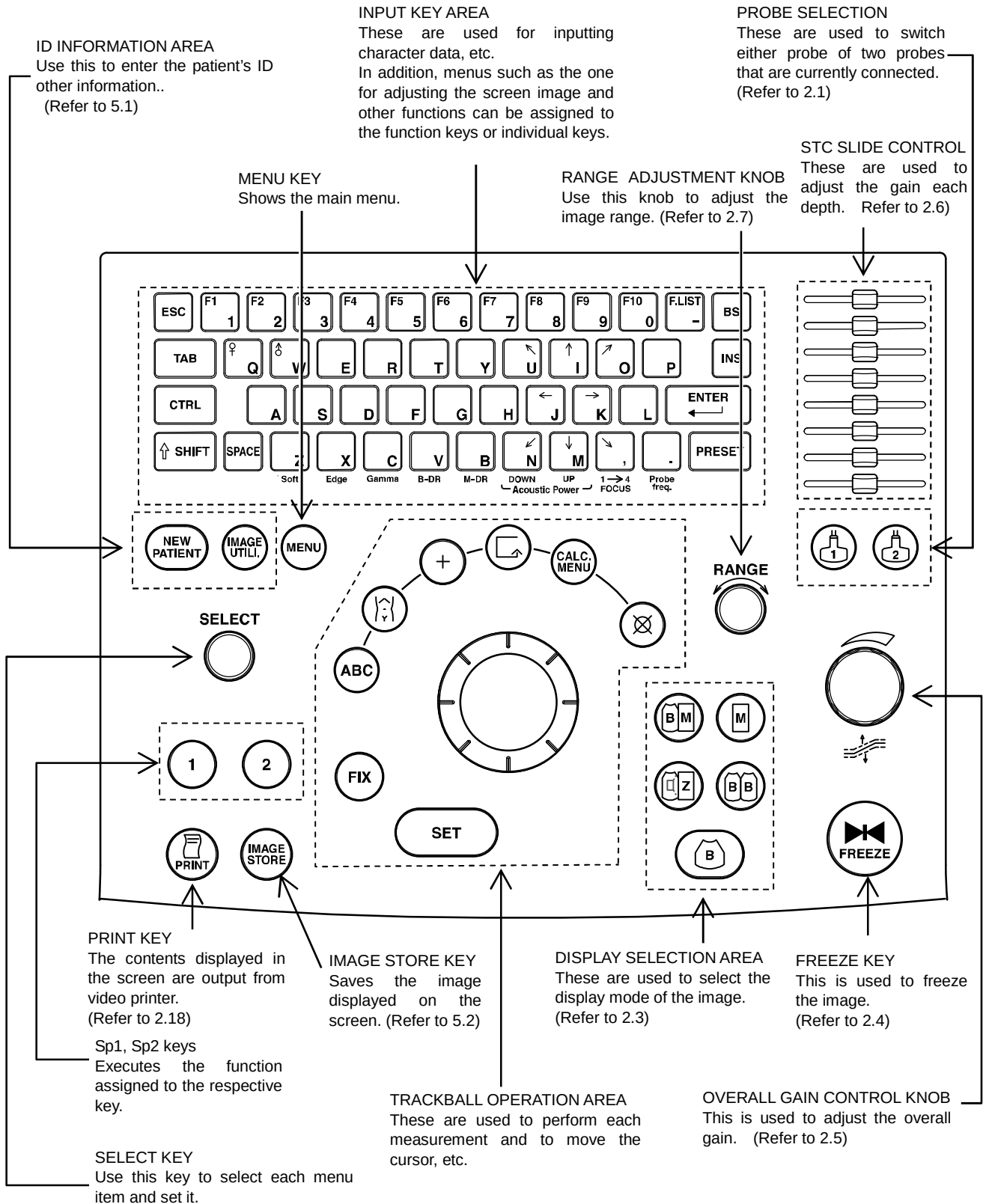
1.2.1 External Views



1.2.2 Keyboard

This item describes the name and function of each feature on the keyboard.

◆GENERAL VIEWS

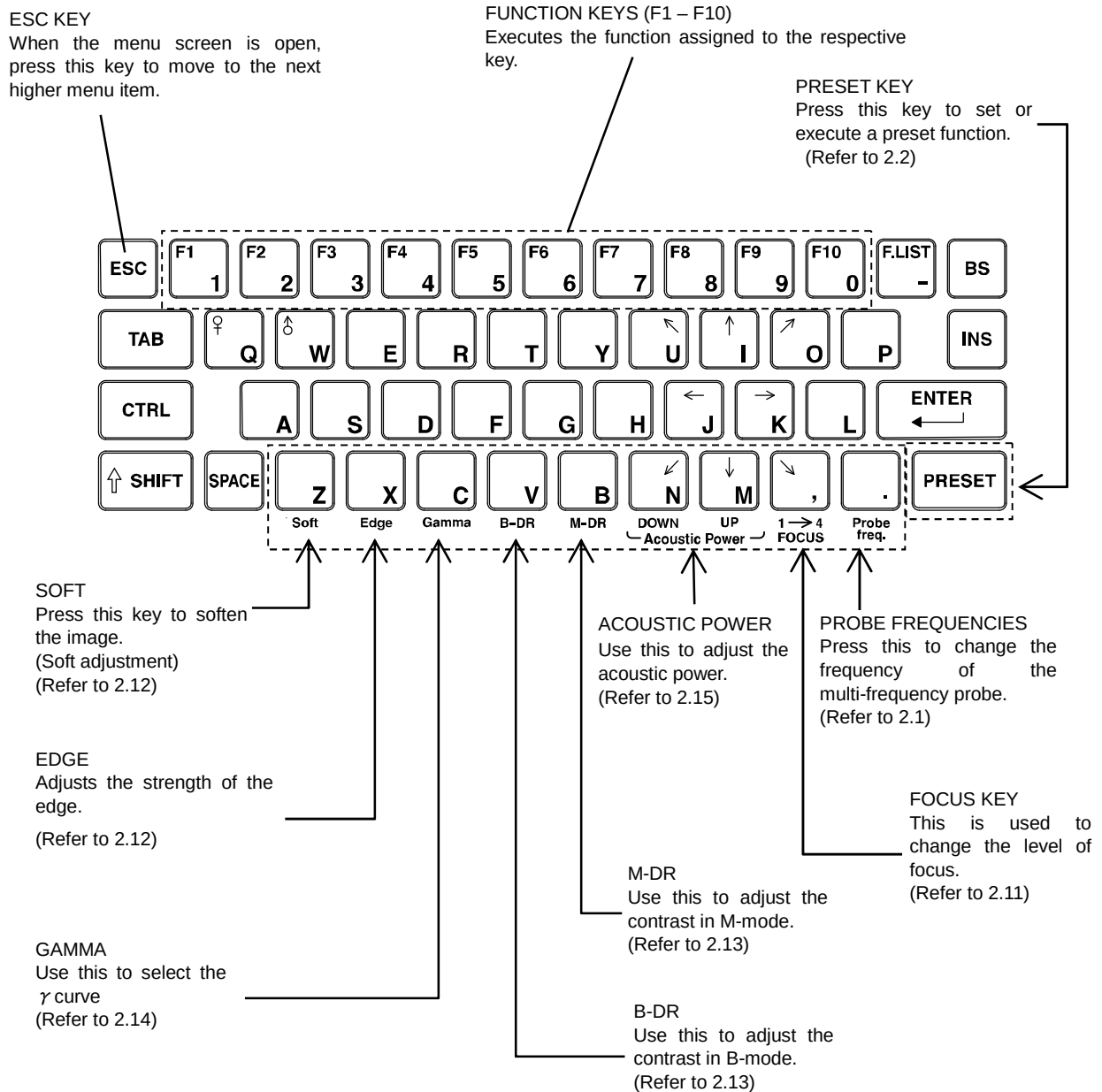


◆ CHARACTER INPUT KEY AREA

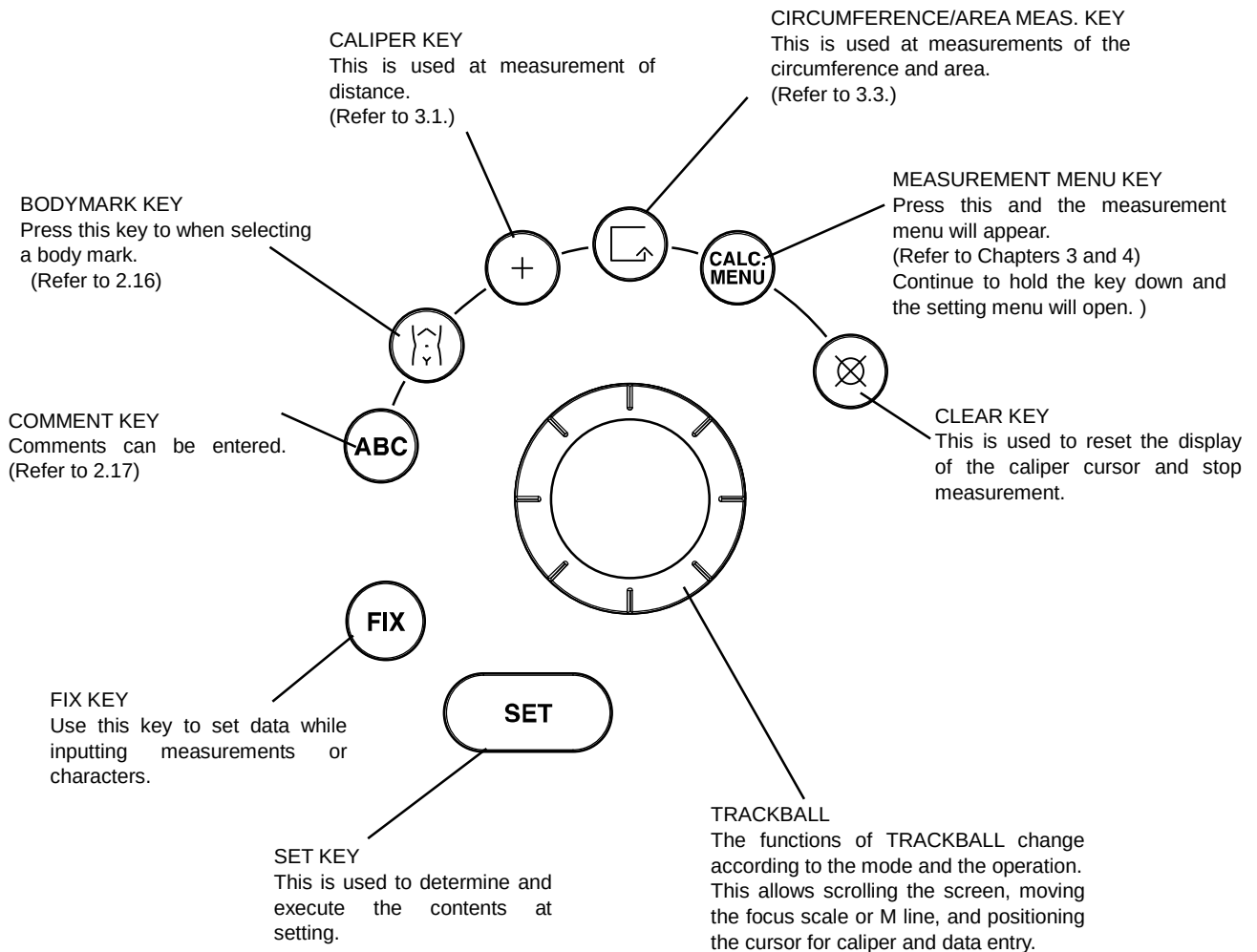
FUNCTION KEYS AND CHARACTER KEYS

This can be used for starting a diagnostic program in memory or opening the menu. They can also be used for alphanumeric input.

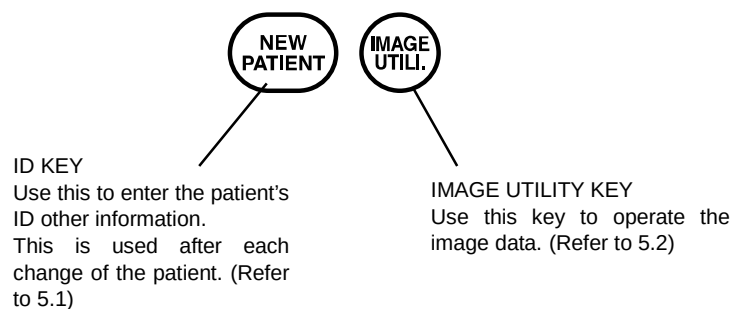
Menus such as the one for adjusting the screen image and other functions can be assigned to the function keys or individual keys.



◆ TRACKBALL OPERATION AREA



◆ ID INFORMATION AREA



◆DISPLAY SELECTION AREA

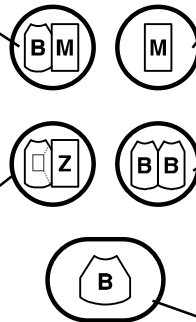
B/M MODE KEY
This is used to display the image
with B/M mode.
(Refer to 2.3.3.)

M MODE KEY
This is used to display the image
with the M mode.
(Refer to 2.3.5.)

B/B MODE KEY
This is used to display the B-mode
image on two screens.
(Refer to 2.3.2)

B/Z MODE KEY
Use this to enlarge one part of
the B-mode display.
(Refer to 2.3.4)

B MODE KEY
This is used to display the image
with the B mode.
(Refer to 2.3.1.)



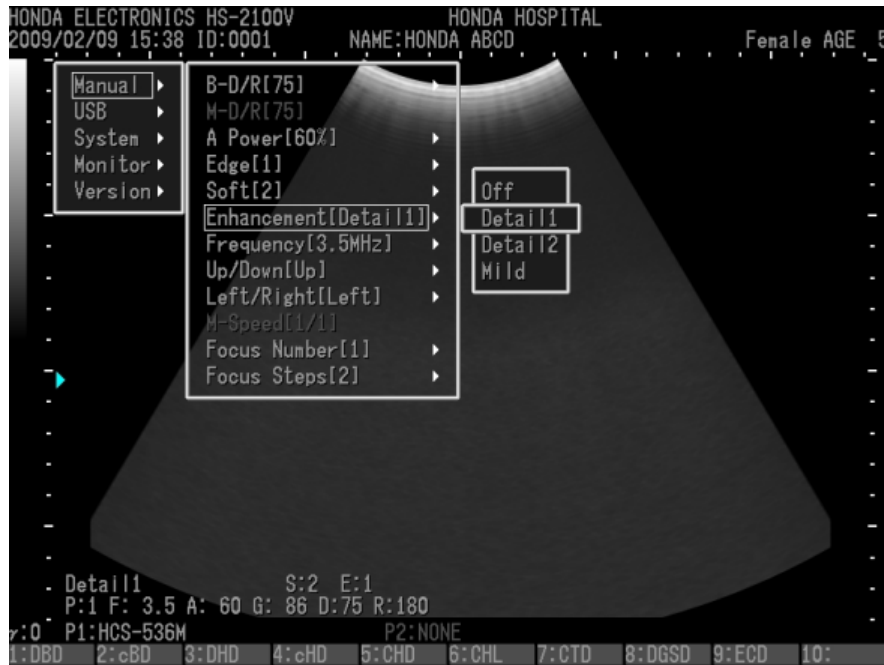
1.2.3 Screen Display

This item describes the display screens and the menus.

◆Screen Display



◆ Explanation of the menus



Press the  key or the key to display the menu and the menu screen appears.

Use **SELECT** () to select the item. The selected item will be have a box around it.

Press **SELECT** (ON) to confirm.

If there is a  next to the menu item, a submenu will be displayed.

When the menu screen is open, press the  key to move to the next higher menu item.

Press the  key or the key used to open the menu and menu now open will be closed.



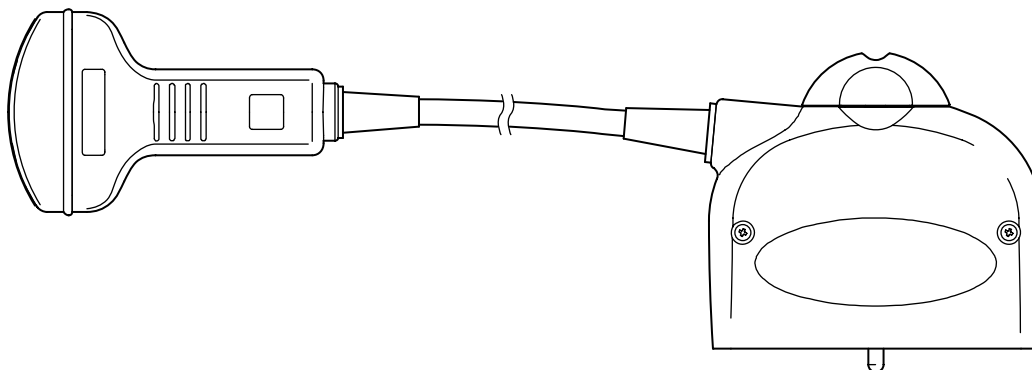
Example: The Preset Menu can be closed by the  key or the  key.

1.3 ACCESSORIES CONNECTIONS

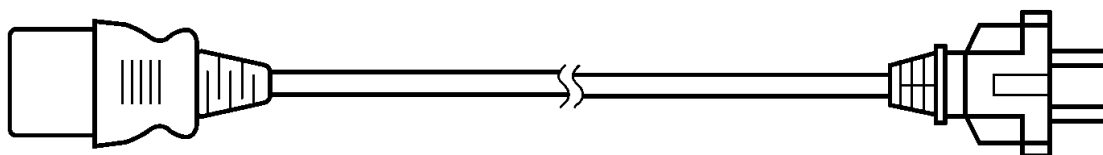
Check that the following accessories are composed with the main device before unpacking.

1. Accessories

O Probe (2. Select from among the optional probes.)



O Power Cable



O Ultrasound gel

2. Option

O Printer (UP-897MD or P93)

O Probe

Type of Probe

·Convex	60R	2.8MHz,3.5MHz,5.0MHz	(HCS-536M)
·Convex	60R	2.8MHz,3.5MHz,5.0MHz	(HCS-436M)
·Convex	20R	3.5MHz,5.0MHz,7.0MHz	(HCS-452M)
·Convex	12R	5.0MHz,7.5MHz,9.0MHz	(HCS-5712M)
·Convex	10R	5.0MHz,7.5MHz,9.0MHz	(HCS-4710M)
·Convex	10R	5.0MHz,7.5MHz,9.0MHz	OPU (HCV-4710MV)*
·Linear	80mm	2.8MHz,3.5MHz, 5.0MHz	(HLS-438)
·Linear	50mm	5.0MHz,7.5MHz,10.0MHz	(HLS-575M)
·Linear	50mm	5.0MHz,7.5MHz,10.0MHz	(HLS-475M)
·Linear	40mm	6.0MHz,8.5MHz,11.0MHz	(HLS-584M)
·Linear	30mm	7.5MHz,10.0MHz,12.5MHz	(HLS-513M)
·Linear	30mm	7.5MHz,10.0MHz,12.5MHz	(HLS-413)
·Linear	50mm	5.0MHz,7.5MHz,10.0MHz	Rectal (HLV-575M)
·Linear	50mm	5.0MHz,7.5MHz,10.0MHz	Rectal (HLV-475M)
·Linear	120mm	1.5MHz,2.0MHz,3.0MHz	(HLV-4212M)*



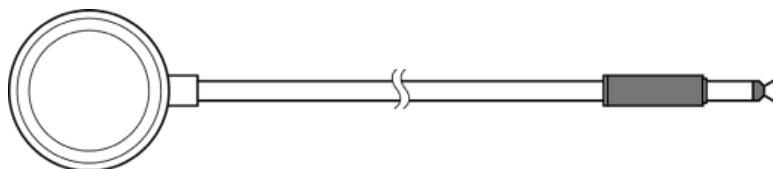
All of the probes shown above are multifrequency probes.

* Special order

O Cassette (HWA-03, HWA-05)

O Water bag (HWB-02)

O Foot Switch (SFUS-1GR Cable length 2.5m)

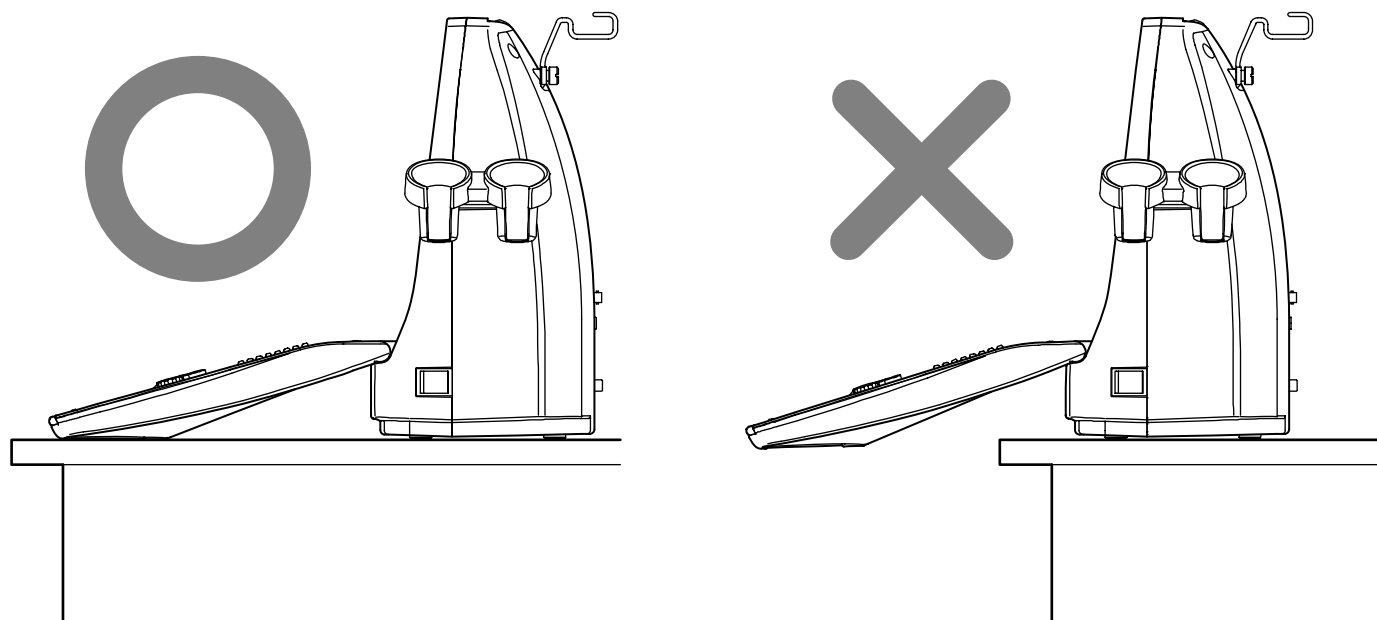


1.4 INSTALLING THE EQUIPMENT AND MAKING CONNECTIONS

This section describes how to set up the equipment and make connections.

1.4.1 Installation Conditions

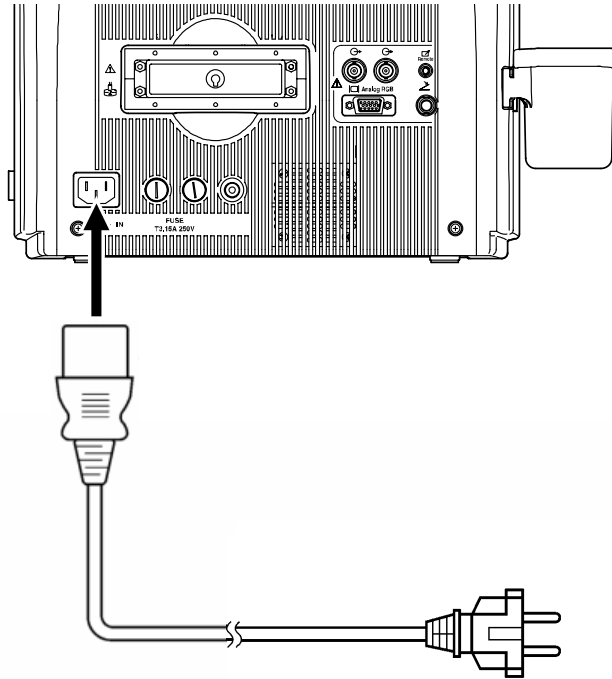
This item describes the installation of HS-2100V.



Set the keyboard onto the table without fail.
Dropping the main body can cause injury or damage.

1.4.2 Power Connections

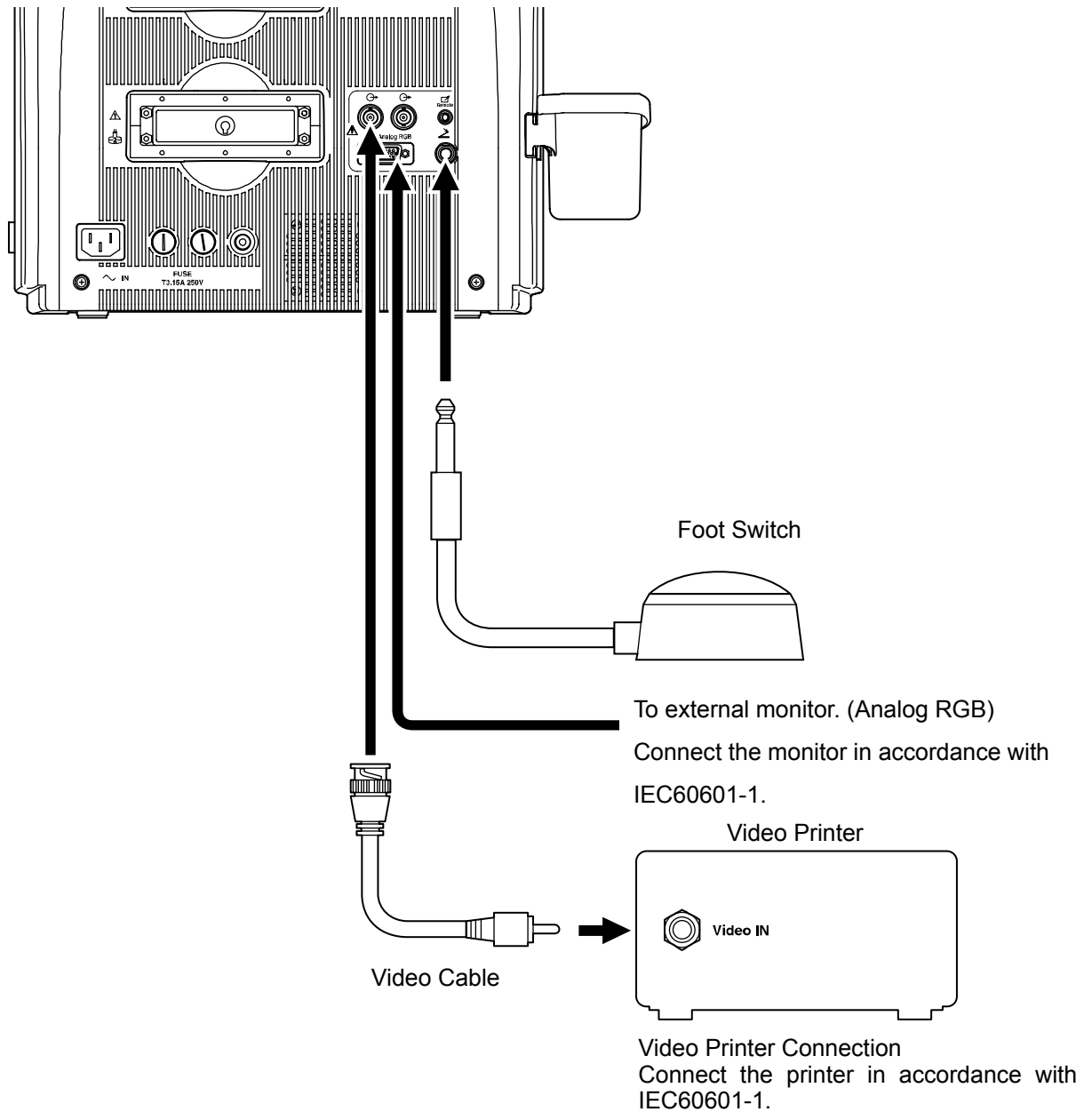
This item describes the connection method of the power cable.



Operate this equipment with its ground terminal connected without fail. Failure to do so could cause electrical shock.
Always use the power supply cord provided. Never use a cord other than the designated cord as this is dangerous and could cause an accident.

1.4.3 Interface Connection

This item describes the interface connection of the video printer and external monitor.



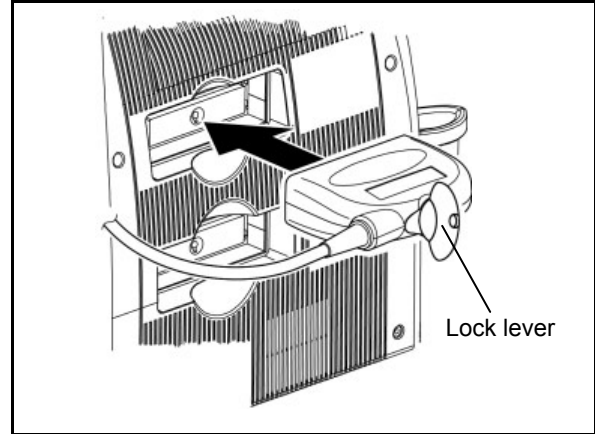
1.4.4 Probe Connection

This item describes the probe connection.

1. Connect the probe to the connecting socket in the rear panel of the main body.



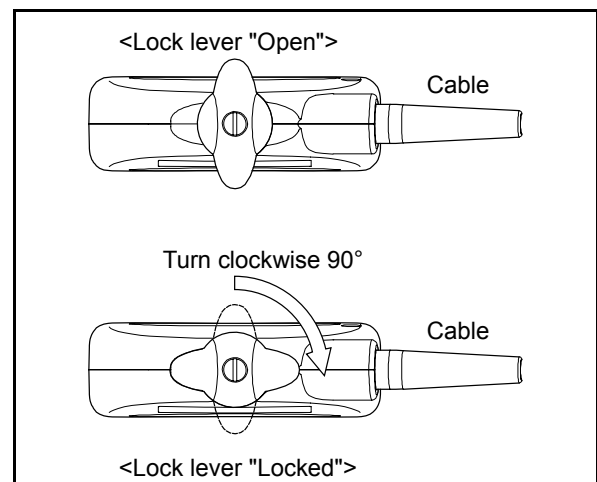
Before connecting the probe, check that the locking lever is in the "OPEN" position. Failure to do so could damage the connecting pin.



2. Turn the lock lever 90° in clockwise to lock the probe connector in place.



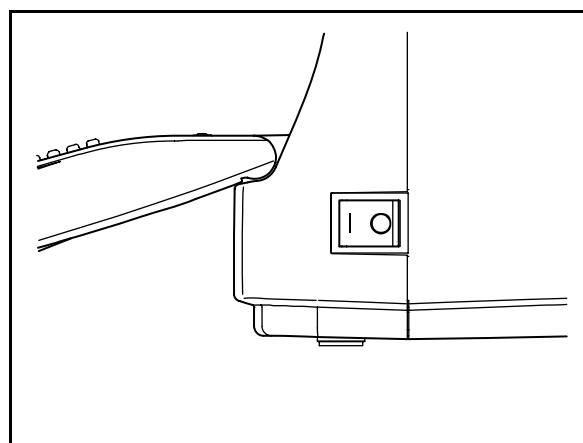
Only attach/remove the probes when the power is off. If the probe is attached/ removed with the power on, it will not be properly recognized by the unit. In addition, it could also result in damage to the probe.



1.5 GENERAL OPERATING STEPS

This section describes the basic operating steps.

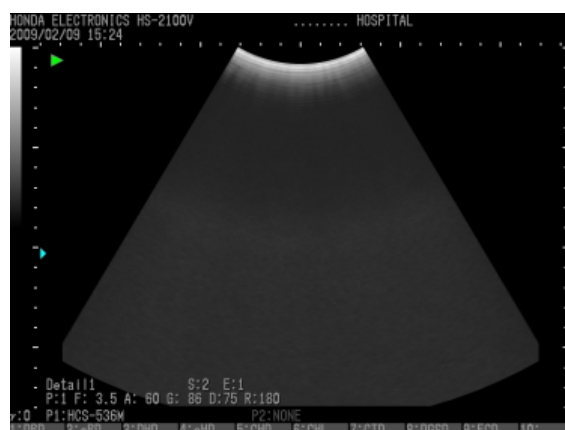
1. Turn ON ("I" side) the power switch at the right surface of HS-2100V.
The lamp color of the selected probe key will change to blue and the screen will appear.



2. If the screen is difficult to see, press the  key and use **Monitor**-**Brightness** to adjust the brightness of the screen. Refer to 1.2.3 for more information about the operation of menu items.



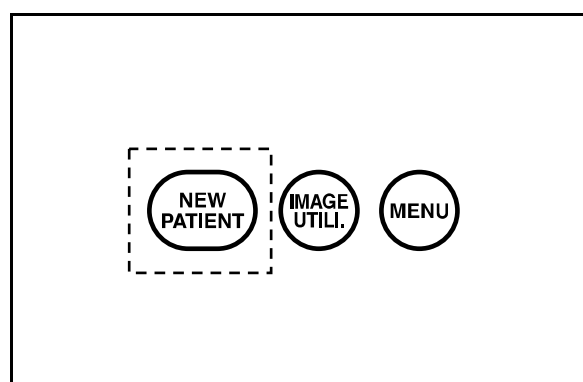
Refer to "2.24 SCREEN BRIGHTNESS ADJUSTMENT".



3. Enter the ID data.



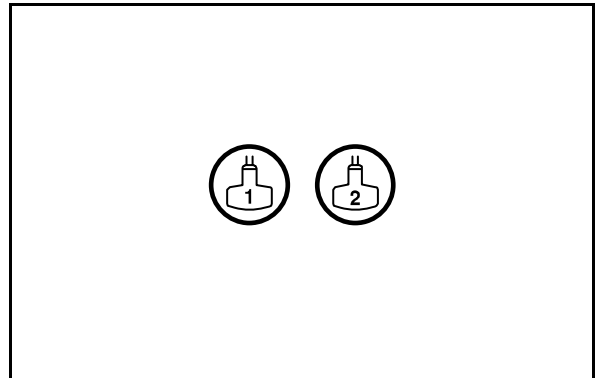
Refer to "5.1.1 Saving the ID Data".



4. If two probes are connected, press either from   key to select the probe.



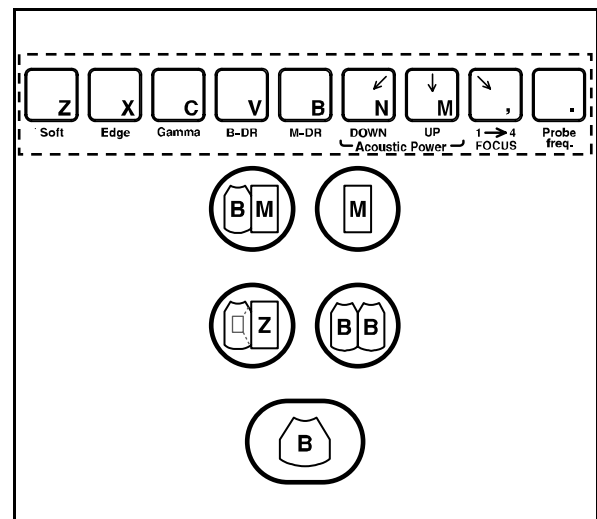
When only one probe is connected, it will automatically be selected and the lamp color of the key for that probe will change to blue.
Refer to “2.1 PROBE SELECTION”.



5. Spread the ultrasound transmission gel on the examination surface of the probe or the portion of the body to be examined. Then put the probe on the portion to be examined.
6. Set the gain, focus, range and other areas.



Refer to Chapter 2 for each setting.



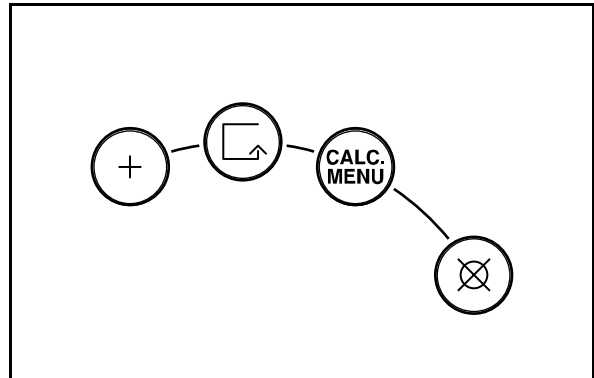
7. Press the  key to freeze the image.



8. Perform measurements using the trackball, caliper keys, and other function keys as required.



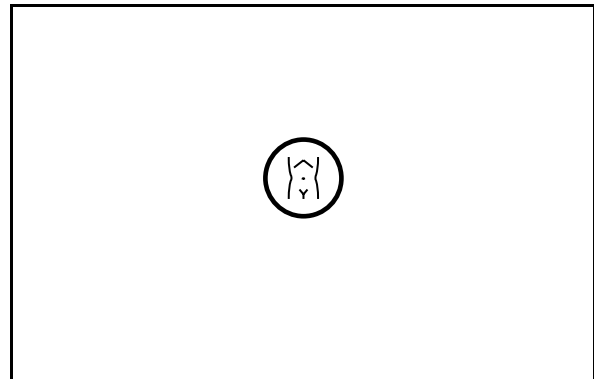
Refer to Chapter 3 and 4 for details about each type of measurement.



9. Press the  key to display the bodymark, and set the position of probe with the aid of trackball.



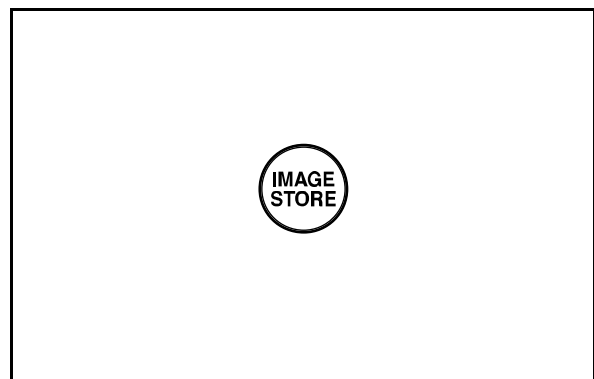
Refer to “2.16 BODYMARK SETTINGS”.



10. Once all the necessary items have been displayed on the screen, press the  key to save the screen.



Refer to “2.18 PRINTING OUT IMAGE” if you would like a print out of the screen.



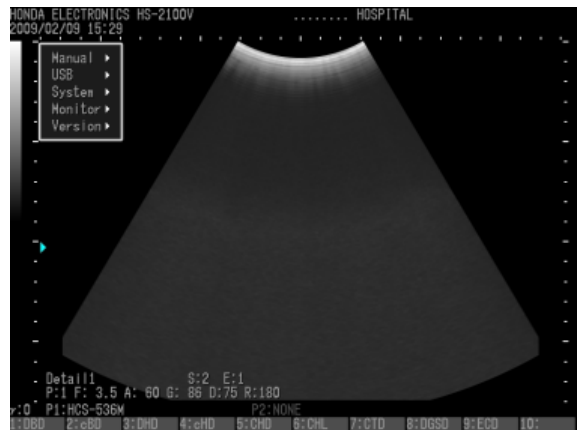
1.6 TIME/HOSPITAL NAME SETTINGS

If this is the first time to use the HS-2100V since purchasing it, please make the following settings and save them.

1.6.1 Setting Date and Time

Although a calendar and clock is set on installation previously, it is possible for the user to reset the date/time if necessary. To reset the date/time, take the following steps.

1. Press the **MENU** key. The main menu appears on the screen.
2. Use **SELECT** (↶) to select the **System**-**Date** menu. Press **SELECT** (ON) to execute. The setting menu will appear.
3. Use **SELECT** (↶) to select the appropriate year, month and day. Press **SELECT** (ON) to set.
4. Use **SELECT** (↶) to select the **System**-**Time Set** menu. Press **SELECT** (ON) to execute. The setting menu will appear.
5. Use **SELECT** (↶) to select the appropriate hour, minute and second. Press **SELECT** (ON) to set.
6. Press the **MENU** key to close the menu.



Press the **MENU** key. Use **SELECT** (↶) to select the **System**-**Date Format** menu. Press **SELECT** (ON) to execute. The setting menu will appear. The type of date display can be selected.

YYYY/MM/DD : YEAR, MONTH, and DATE DISPLAY
DD-MM-YYYY : DATE, MONTH, and YEAR DISPLAY
MM.DD.YYYY : MONTH, DATE, and YEAR DISPLAY

1.6.2 Setting Title Name Color

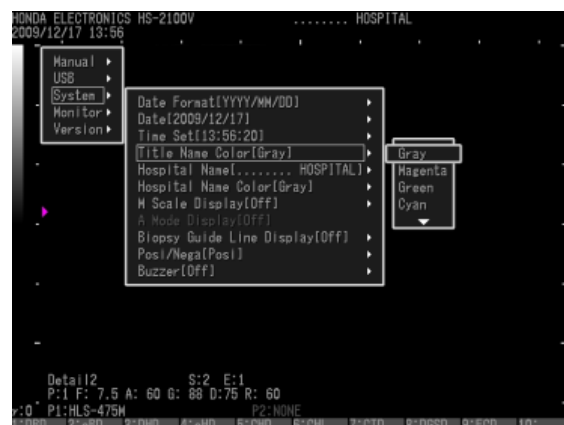
This item describes how to set a character color of “HONDA ELECTRONICS HS-2100” appears on the upper part of screen. Title color setting is protected even if the power is turned off.

1. Press the  key. Main menu appears on the screen.

2. Use **SELECT** () to select **System** **Title Name Color** on menu, press **SELECT** (ON) to execute.

3. Title color can be selected from following 5 colors.

Gray(gray)、**Magenta**(purple-red)、
Green(green)、**Cyan**(light blue)、**Yellow**(yellow)



Use **SELECT** (ON) to make the desired setting selection.

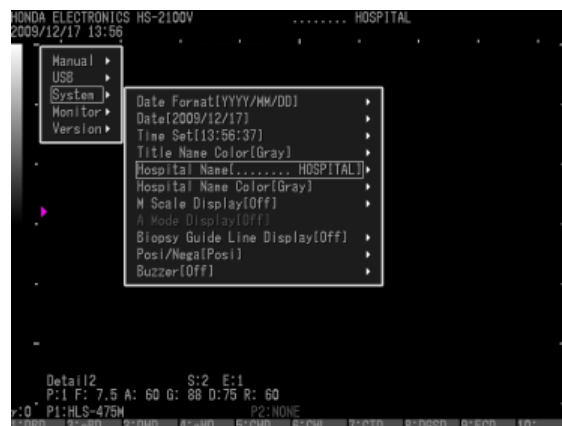
4. Press **SELECT** (ON) and the title color turns into the selected color.
5. Press the  key to close the menu.

1.6.3 Registering Hospital Name

This item describes how to register the hospital name and display it in the space in the upper right side of the screen. Once the hospital name registered, it will be saved even if the power is turned off.

1. Press the  key. The main menu appears on the screen.

2. Use **SELECT** () to select the **System** **Hospital Name** menu. Press **SELECT** (ON) to execute. The input menu will appear.



3. Enter the hospital name with the alphanumeric key.



The maximum number of characters is 40.

4. Press the  key to set the hospital name.
5. Press the  key to close the menu.

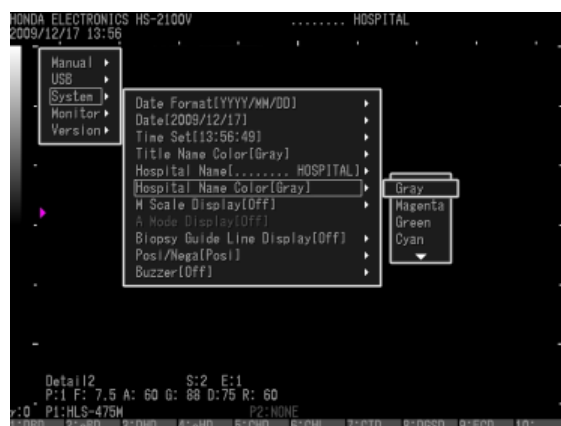
The registration operation is now complete.

1.6.4 Setting Hospital Name Color

This item describes how to set a character color of hospital name that appears on the upper part of screen. The color setting of hospital name is protected even if the power is turned off.

1. Press the  key. Main menu appears on the screen.

2. Use **SELECT** () to select **System** **Hospital Name Color** on menu, press **SELECT** (ON) to execute.



3. Hospital name color can be selected from following 5 colors

Gray(gray)、**Magenta**(purple-red)、
Green(green)、**Cyan**(light blue)、**Yellow**(yellow)

Use **SELECT** (ON) to make the desired setting selection.

4. Press **SELECT** (ON) and the hospital name color turns into the selected color.
5. Press the  key to close the menu.

1.6.5 Setting the Buzzer Sound

This item describes how to set the sound that will be heard each time a button is pressed. Once this sound has been set, it will be saved even if the power is turned off.

1. Press the  key. The main menu appears on the screen.

2. Use **SELECT** () to select the

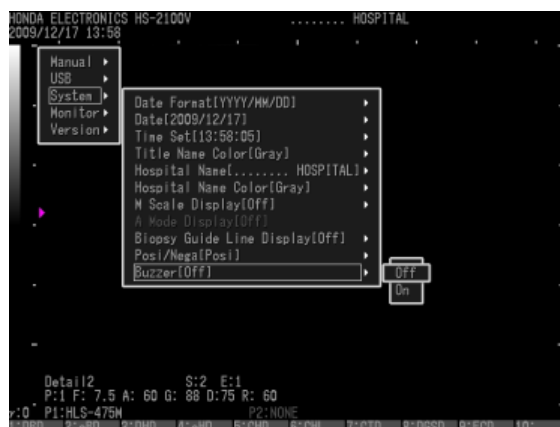
System **Buzzer** menu. Press

SELECT (ON) to execute.

3. Set the buzzer to ON or OFF.

Select either **On** or **Off**.

Use **SELECT** () to make the desired setting selection.



4. Press **SELECT** (ON) and the selection is set.

5. Press the  key to close the menu.



This sound is set to **Off** in the initial settings.

1.6.6 Setting the Save Destination

This item explains the save destinations for the data.

There are two save destinations: internal memory and external USB memory device.

1. Press the  key. The main menu appears on the screen.

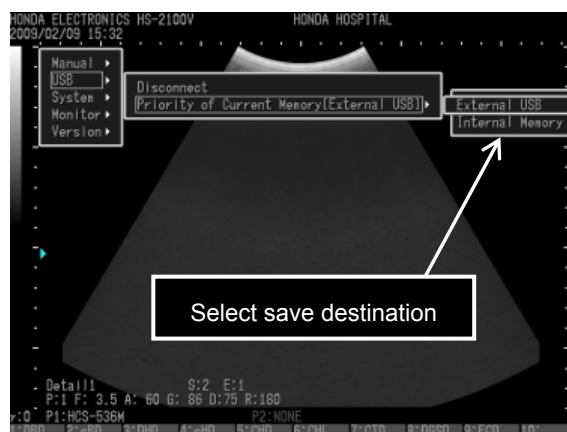
2. Use **SELECT** () to select the **USB** **Priority of Current Memory** menu.

Press **SELECT** (ON) to execute.

3. This sets the save destination.

Select either **External USB** (USB memory device) or **Internal Memory**.

Use **SELECT** () to set the desired destination.



4. Press **SELECT** (ON) and the selected save destination is set.

5. Press the  key to close the menu.



If **External USB** is set but there is no external USB device connected, the save destination will become the Internal Memory.



After pressing the  key to disconnect the USB memory, select **USB** **Disconnect** and press **SELECT** (ON). After the "Memory is removed. Menu will close" window appears, press **SELECT** (ON) and remove the USB memory.

CHAPTER 2 KEY OPERATION AND DISPLAY FUNCTION

This chapter describes the keys and key operations related to the system setting and image display. If the operation of the function key is valid, a single “beep” will be sounded. If the operation is invalid, multiple “beeps” will be sounded.

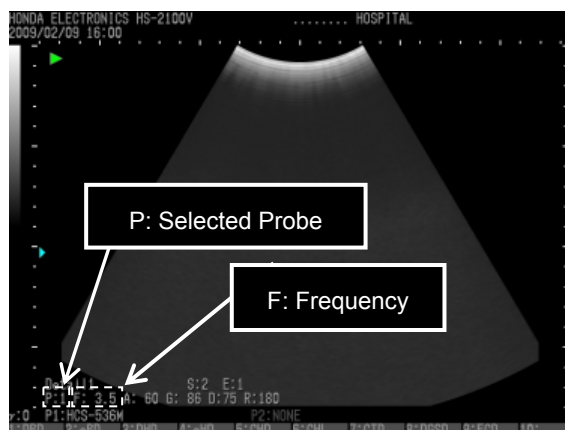
2.1 PROBE SELECTION

This section describes the selecting procedure of probe.

1. Press the  key or  key to select the probe required. The selected probe (1, or 2) will appear at the bottom of the screen. (The selected probe will appear in white; probes that have not been selected will appear in grey.)



When HS-2100V is switched ON, probe 1 is automatically selected except that probe 2 is selected if only probe 2 is connected to the main body.



2. Press the  key or the  and  keys to change the frequency of the probe.

The frequency display (above the probe name) in the lower left hand corner of the screen changes. .



The frequency can be changed even if the selected / key is pushed.



The setting can also be made by using the method shown below.
Press the  key to display the menu.
Set the Manual-Frequency .

2.2 PRESET

On this model, it is possible to save the current conditions (the settings of the probe now being used) as preset condition for the probe that has been selected. (Up to 10 settings per probe can be saved.)

In addition, this function can be used to change the settings when the unit is started as well.

2.2.1 Saving a Preset

This item describes how to save the settings of the currently selected probe as a preset.

1. Press the **PRESET** key for one second.
2. Use **SELECT** (↷) to select **Current Setting** → **Store**. Press **SELECT** (ON) to execute.
3. Use **SELECT** (↷) to select the save destination. (Preset 1 to 10.)
4. Press **SELECT** (ON) and the current settings are saved in the selected preset.



If you wish to change the name of the preset, press the **PRESET** key for one second, select the Preset that you wish to change and change with **Preset Name**.



If you wish to copy one preset to another, press the **PRESET** key for one second, designate the source to be copied, select **Store** and then select the copy destination.



The contents saved in a preset can be confirmed when the copy source of the preset is designated. (The parameters will appear.)

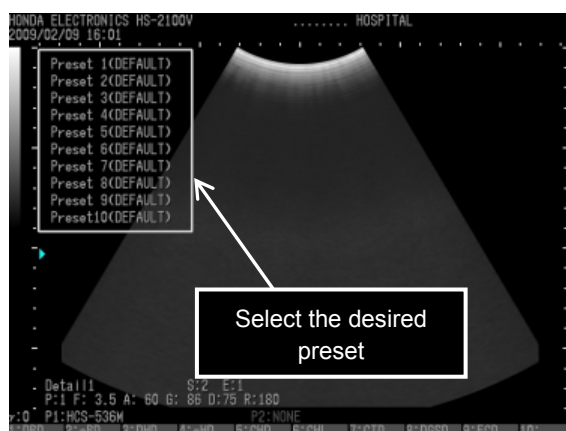


The Preset 10 setting will be used when the unit is started and when the probe is changed.

2.2.2 Selecting a Preset

This item explains selecting a preset.

1. Press the **PRESET** key.
Preset 1 to Preset 10 will be displayed.
2. Use **SELECT** (↶) to select the desired Preset. It is also possible to directly call up Preset 1 through Preset 10 by using the corresponding F1 through F10 keys.
3. Press **SELECT** (ON) and the selected Preset is set.

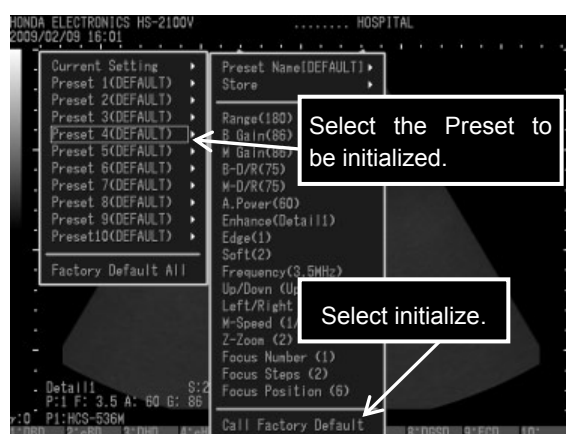


If the selection is made during Freeze mode, a “UnFreeze is OK?” prompt will appear. If you want to unfreeze and set as a Preset, select **Yes**. If you select **No**, the freeze mode will be maintained, but the Preset will not be set.

2.2.3 Initializing a Preset

This item explains initializing a preset. (The following operation initializes the unit to the factory settings.)

1. Press the **PRESET** key for one second.
2. Use **SELECT** (↶) to select the Preset to be initialized and then press **SELECT** (ON).
3. Use **SELECT** (↶) to select **Call Factory Default**. Press **SELECT** (ON) to execute.



To initialize all Preset, press the **PRESET** key for one second and select **Factory Default All**.



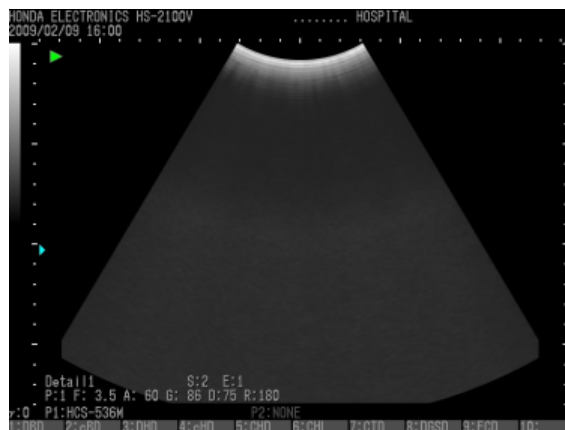
The initialization of the Preset will only be performed for the currently selected probe.

2.3 IMAGE DISPLAY MODE SELECT

This section describes selecting method of the display type and the operation mode.

2.3.1 B Mode

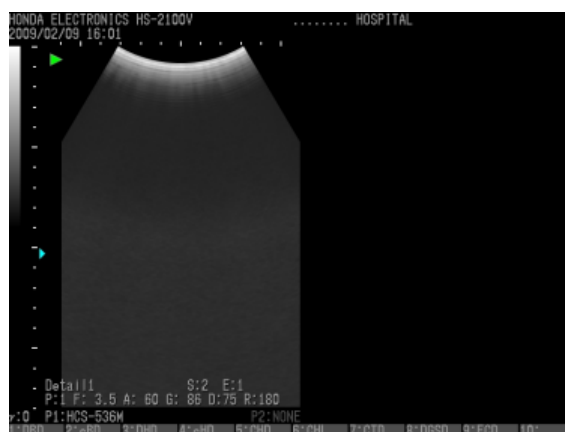
1. Press the  key. The B mode image with 1 screen appears on the monitor.



2.3.2 B/B Mode

In the B/B mode, two screens can be used to compare B-mode images.

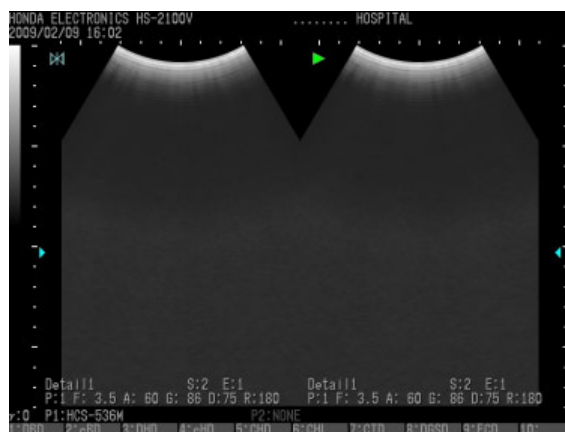
1. Press the  key and the B-mode image will appear on the left side.
2. Press the  key once again and a B-mode image will appear on the right side.
3. Once the two screens are displayed, pressing the  once again enables switching of the active side.



If the  key is pressed in the scan mode, the probe settings, etc. will be transferred and the active side will be switched. (In this case, the side that is active will be in the scan mode.)

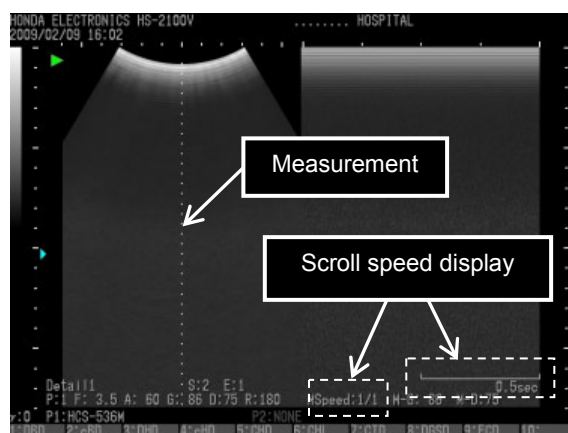


If the  key is pressed in the freeze mode, the probe settings, etc. for each will be maintained and the active side will be switched. (In this case, both screens will remain in the freeze mode.)



2.3.3 B/M Mode

1. Press the  key. The B mode image appears on the left side, and the M mode image appears on the right side of the screen. The M mode measurement line will be displayed as the dotted line in the B mode image on the left side. Use **SELECT** () to move this measurement line.



Use the menu to set the scroll speed in M-mode. Refer to “2.19 SETTING M-SPEED”.



The M-mode measurement line can only be moved in the scan mode.



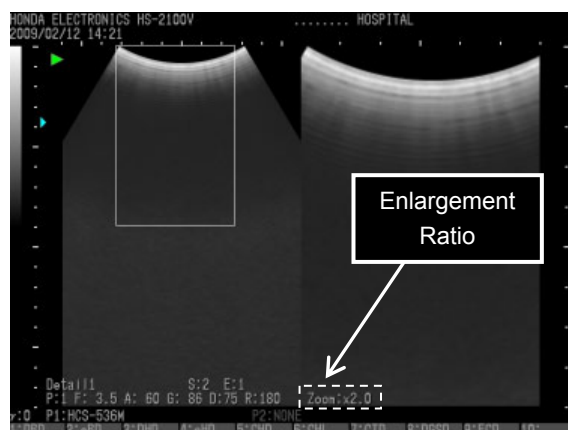
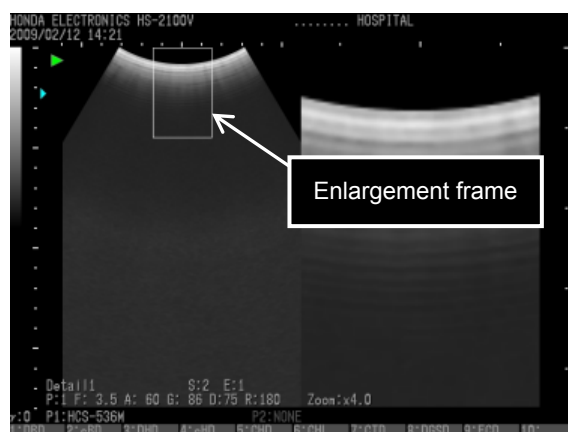
The position of the M-mode measuring line for M-mode will be in the same position as the M-mode measuring line in the BM-mode.

2.3.4 B/Z Mode

1. Press the  key and part of the B-mode image will be enlarged on the right side of the screen. The enlargement frame shows the area that is being enlarged.

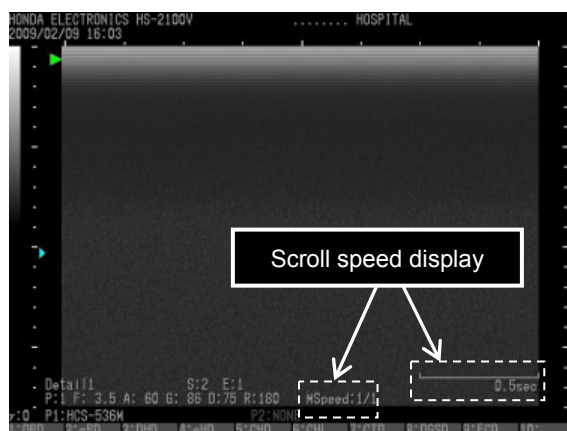
Use the trackball to determine the area to be enlarged. (The enlargement frame moves.)

Use **SELECT** () to change the enlargement ratio ($\times 2$ to $\times 4$). (The size of the enlargement box will change and the enlargement ratio will be displayed on the screen.)



2.3.5 M Mode

1. Press the  key. The M mode image appears on the screen.



Use the menu to set the scroll speed in M-mode.
Refer to “2.19 SETTING M-SPEED”.



The position of the M-mode measuring line for M-mode will be in the same position
as the M-mode measuring line in the BM-mode.

2.4 FREEZING IMAGE and CINE MEMORY

This section describes freezing the image (creating a still image).

2.4.1 Freezing Image

For measurements and calculation, the echo image should be frozen beforehand. HS-2100V offers following way to freeze the image.

- Press  button on the key board.



To unfreeze the image, perform the same operation again.



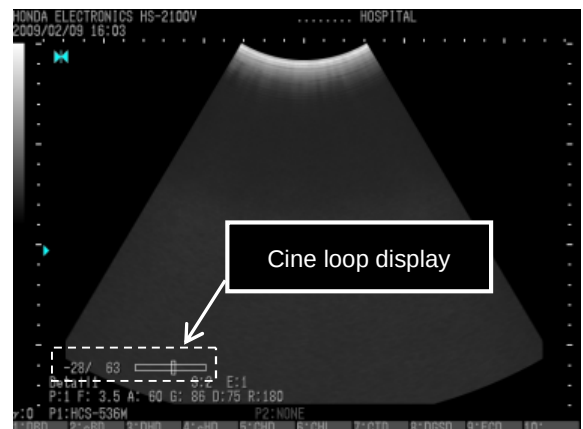
Some of the parameter settings and key operations are invalid when the image is frozen.



The measurement data will be erased when freeze is cancelled. (Except obstetrical measurements.)

2.4.2 Cine memory and Cine loop

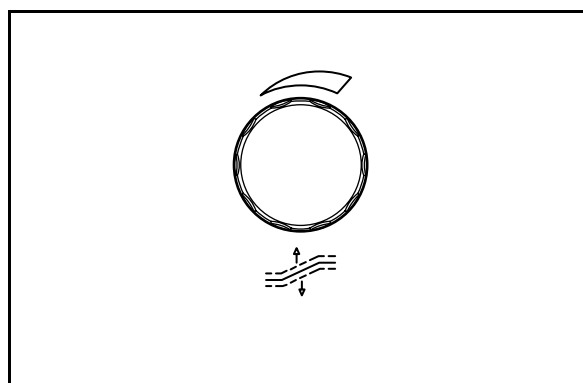
1. Once the image is in freeze mode, the **RANGE** (↔) knob can be used to display the image prior to freeze mode using frame-by-frame advance.
2. Once the image is in freeze mode, pressing **RANGE** (ON) will start the cine-loop display and the image prior to freeze mode will be played in a repeating loop. Turn the **RANGE** knob to the left to play the image in slow motion (1/1 → 1/4 → 1/16). Turning the knob in the opposite direction (right) will restore play speed (1/16 → 1/4 → 1/1). Press **RANGE** (ON) once again during play mode will freeze the playback image.



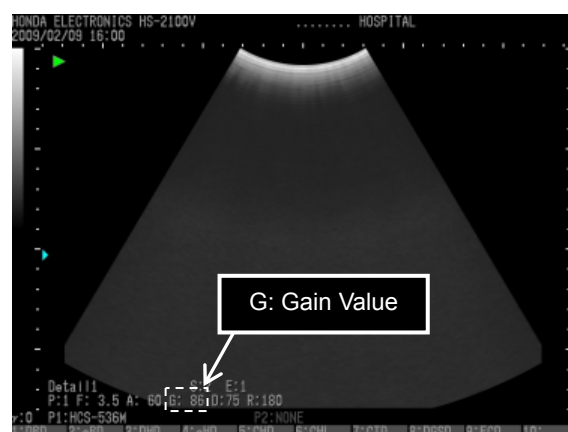
2.5 SETTING GAIN

This section describes adjusting the overall gain (sensitivity) for the reflecting echo level.

1. Use the total gain adjustment knob to adjust the sensitivity of the overall reflection echo level. The gain that has been set will be displayed.
(G:36 to 100)



Overall Gain Control Knob



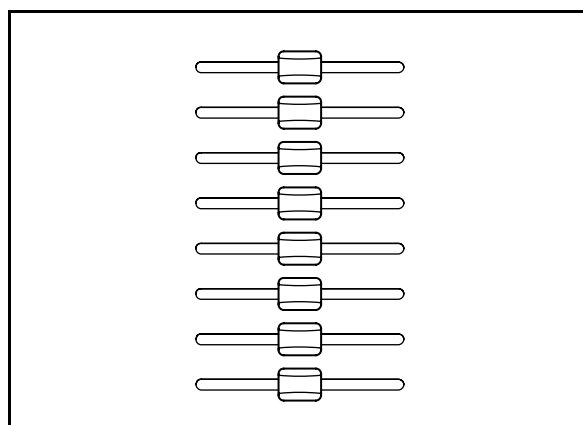
Only the gain of M mode image can be adjusted in the B/M mode.
The B-mode gain will remain at the value it was prior to switching to B/M-mode.

2.6 SETTING TIME GAIN COMPENSATION (STC)

This section describes the reflected echo level adjustment for each depth.

1. The system adjusts optimum echo gain for each depth range by sliding the 8 STC slide controls toward right or left. Adjust so that there is an even image overall.

Slide the lever to the left to lower sensitivity.
Slide the lever to the right to increase sensitivity.



STC Slide Control

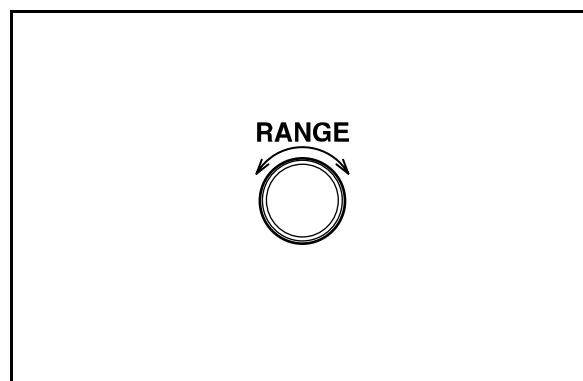
2.7 SETTING RANGE

This section describes the range settings.

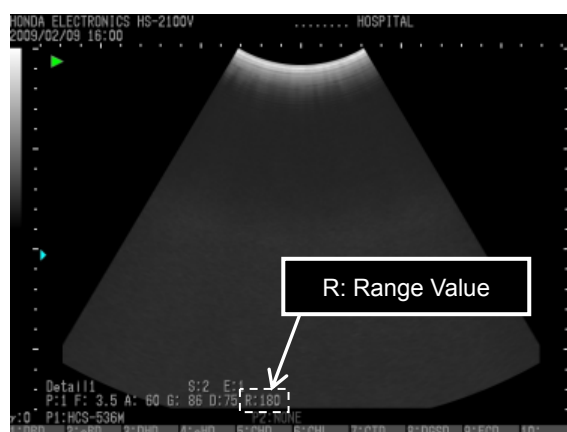
1. Use the range adjustment knob to adjust the range for observing.

Turn the **RANGE** knob to the left to make the observation depth deeper.

Turn the **RANGE** knob to the right to make the observation depth shallower.



Range Adjustment Knob



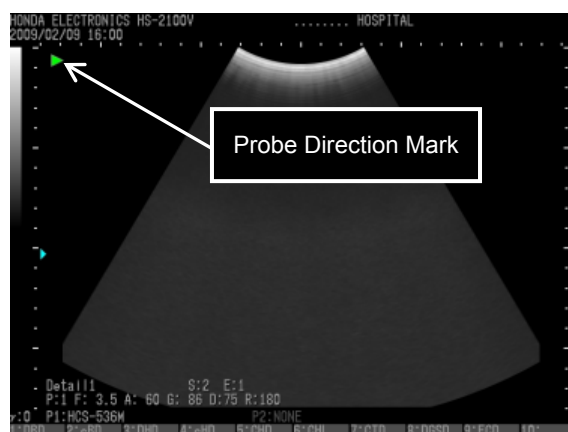
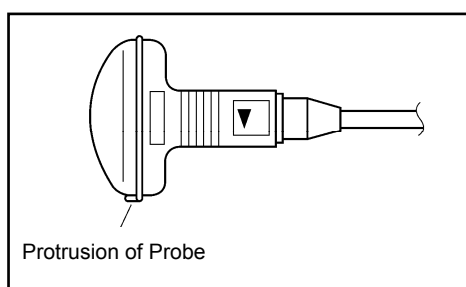
2.8 LEFT/RIGHT INVERSION

This section describes the left/right inversion of the image.

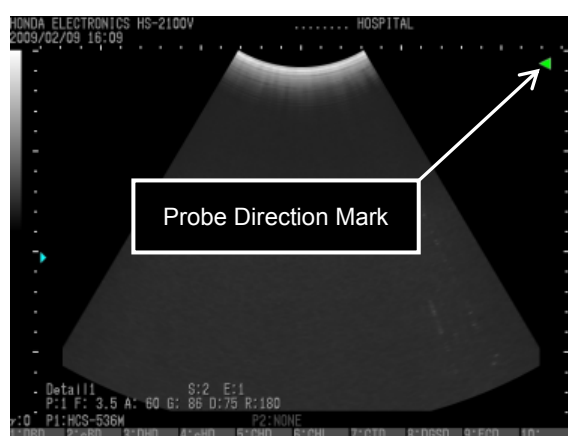
This function is already assigned to keys  and . (During Scan)

1. Press the left/right inversion key ( or  key). Each time the key is pressed, the image will invert in the lateral direction and the probe direction mark on the screen (/) will change.

This  mark corresponds to the protrusion of the probe. Align the probe direction mark and the protrusion of the probe at the examination area.



Normal Image



Left/Right Inversion Image

Use the following procedure to operate by using the menu.

1. Press the  key. The main menu appears on the screen.
2. Use **SELECT** () to select the **Manual** **Left/Right** menu. Press **SELECT** (ON) to execute.

Press the  key to close the menu.



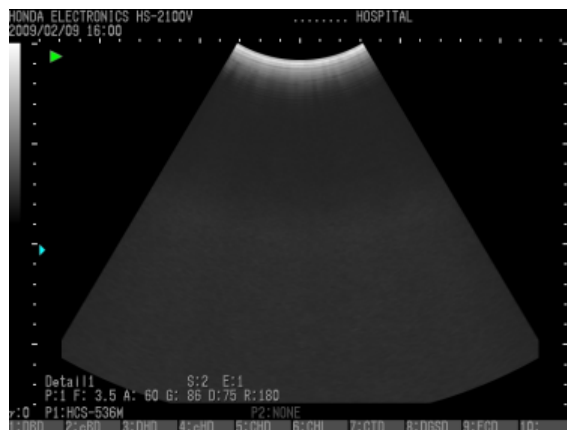
When the image is in the freeze mode, lateral inversion will not be performed even if the   buttons are pushed. However, it can be performed by using the menu.

2.9 UP/DOWN INVERSION

This section describes the up/down inversion of the image.

This function is already assigned to key . (During Scan)

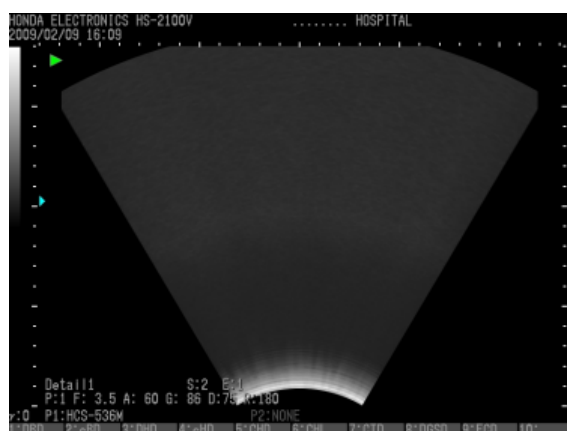
1. Press the  key. Each time this button is pushed, the display will toggle between the normal and vertical inversion screen.



Normal Image

Use the following procedure to operate by using the menu.

1. Press the  key. The main menu appears on the screen.
2. Use **SELECT** () to select the **Manual** **Up/Down** menu. Press **SELECT** (ON) to execute.
3. Set the up/down inversion.
Select **Up** (normal setting) or **Down** (inverted).
Use **SELECT** () to make the desired setting selection.



Up/Down Inversion Image

4. Press **SELECT** (ON) and the selection is set.

Press the  key to close the menu.



When the image is in the freeze-mode, Up/Down inversion will not be performed.

2.10 POSTIVE/NEGATIVE INVERSION

This section explains the positive/negative inversion of the image.

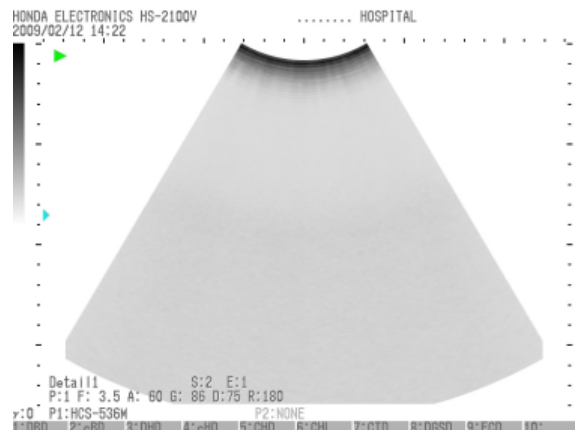
Once the positive/negative setting has been set, it will be saved even if the power is turned off.

1. Press the  key. The main menu appears on the screen.

2. Use **SELECT** () to select the **System** **Posi/Nega** menu. Press **SELECT** (ON) to execute.



3. Set the positive/negative (Posi/Nega) inversion. Select **Posi** (normal setting) or **Nega** (inverted). Use **SELECT** () to make the desired setting selection.



Posi/Nega inverted image

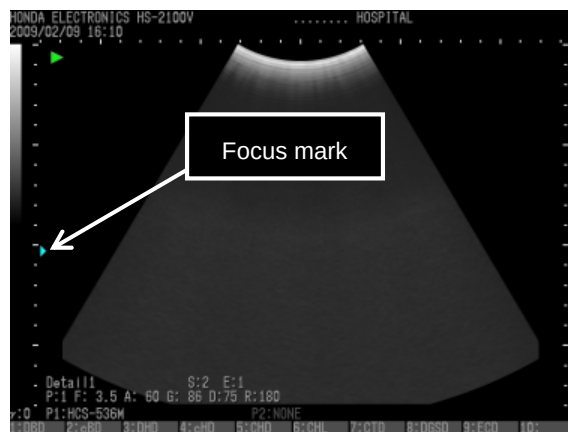
4. Press **SELECT** (ON) and the selection is set.

Press the  key to close the menu.

2.11 FOCUS SETTING

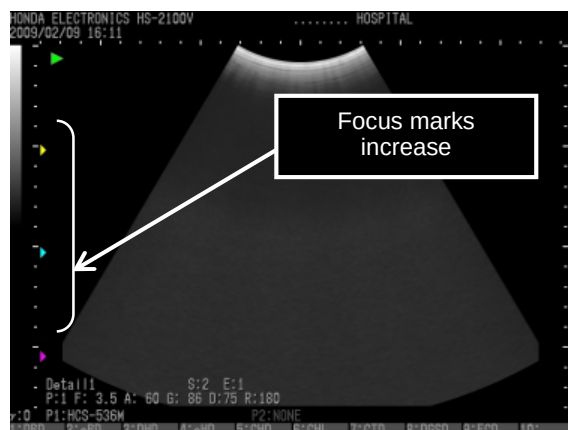
This section describes the focus setting procedure.

1. Use the track ball to move the focus mark and set the focus position.



Focus Number 1

2. Set the stage number of the focus by pressing the  key (1 to 4 stages). The frame rate will slow down as the stage number of the focus increases. (Refreshing of the screen will be delayed.)



Focus Number 3

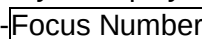
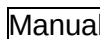
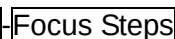


Each time the  key is pressed, the focus stage setting moves from 1 → 2 → 3 → 4 → 1 → 2 . . .
+Each time the  and  keys are pressed, the focus stage setting moves from 4 → 3 → 2 → 1 → 4 → 3 . . .



Each time the  key is pressed, the focus gap setting moves from 0 → 1 → 2 → 0 → 1 → 2 . (Widens)
+Each time the  and  keys are pressed, the focus gap setting moves from 2 → 1 → 0 → 2 → 1 → 0 . (Narrows)



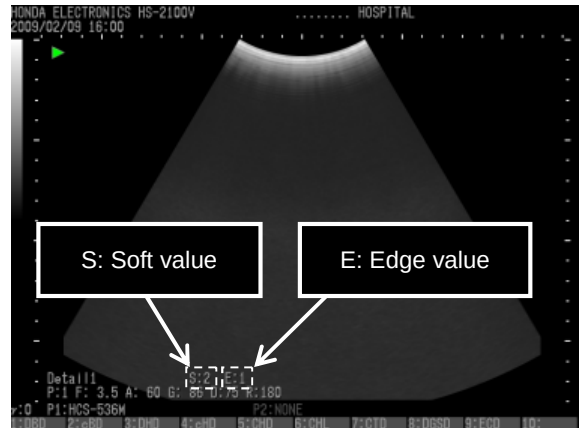
The setting can also be made by using the method shown below.
Press the  key to display the menu.
Set the    .

2.12 IMAGE SOFT ADJUSTMENT AND EDGE ENHANCEMENT

This section describes the settings for the soft adjustment and edge enhancement that can make the ultrasound image easier to see.

Soft adjustment

1. Press the  key. This makes the image softer and reduces noise.



Edge enhancement

1. Press the  key. The edge of the image is enhanced.



Each time the  key is pressed, the soft setting moves from 1 → 2 → 3 → 4 → 0 → 1...

Each time the  key is pressed, the edge setting moves from 0 → 1 → 2 → 3 → 0 → 1...



The setting can also be made by using the method shown below.

Press the  key to display the menu.
Set the **Manual-Edge**, **Manual-Soft**.

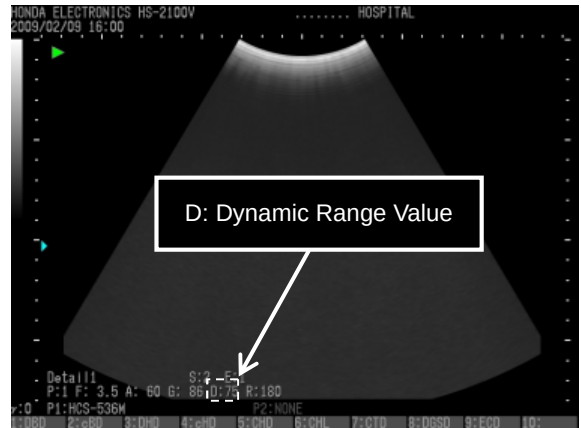
2.13 SETTING DYNAMIC RANGE

This section describes adjusting the contrast of the image in the B- and M-modes.

As the dynamic range value is increased, it is possible to display from a strong echo to a weak echo.

For B-mode

- Each time the  key is pressed, the dynamic range value increases.
+Each time the  and  keys are pressed, the dynamic range value decreases.
The value will change in increments of 10 dB, from 35 dB to 95 dB.



For M-mode

- Each time the  key is pressed, the dynamic range value increases.
+Each time the  and  keys are pressed, the dynamic range value decreases.
The value will change in increments of 10 dB, from 35 dB to 95 dB.



The setting can also be made by using the method shown below.

*Settings can be changed in 1 dB increments if the setting is done from the menu.

Press the  key to display the menu.

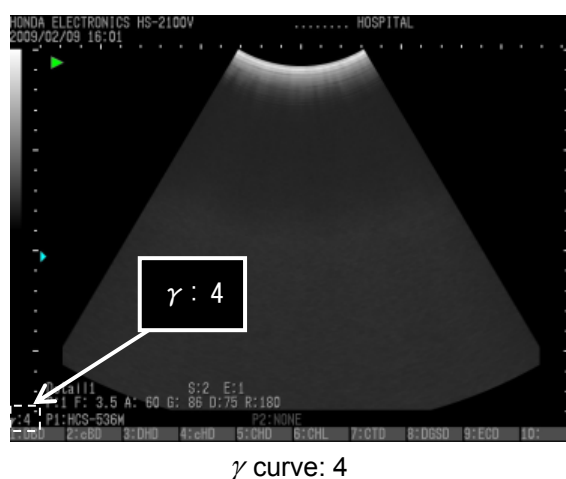
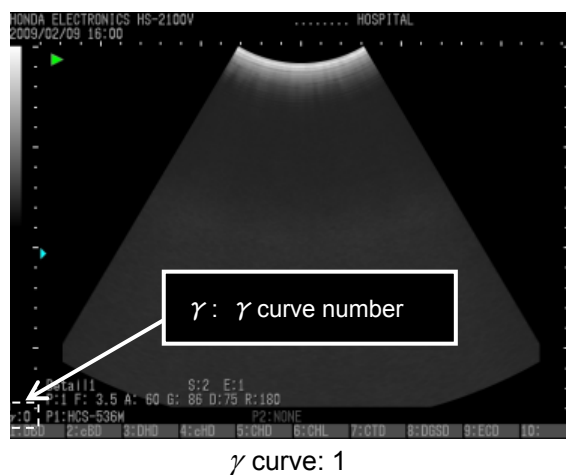
In B-mode, set  . In M-mode set  .

2.14 SETTING γ Curve

This section describes about the settings (γ Curve) for the LCD monitor that can make the ultrasound images easier to view.

- Each time the  key is pressed, the γ curve number is increased.

Each time the  and  keys are pressed, the γ curve number is decreased.



The setting can also be made by using the method shown below.
Press the  key to display the menu.
Set the  .

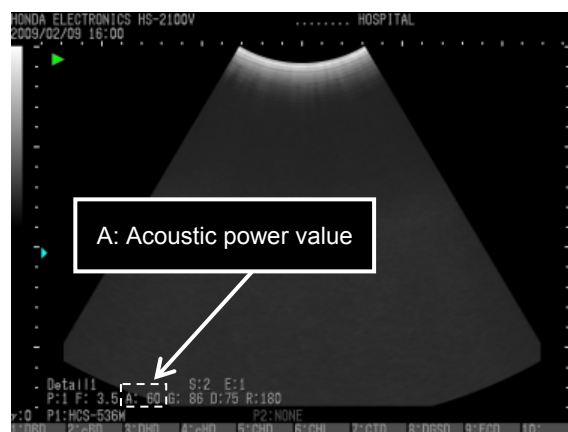
2.15 SETTING ACOUSTIC POWER

This section describes how to adjust the acoustic power.

1. Each time the  key is pressed, the acoustic power value is increased.

Each time the  key is pressed, the acoustic power value is decreased.

The value changes in 10% increments, from 20% to 100%.



The setting can also be made by using the method shown below.

Press the  key to display the menu.

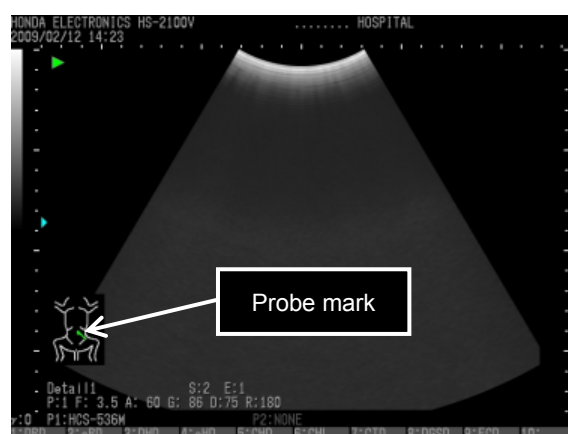
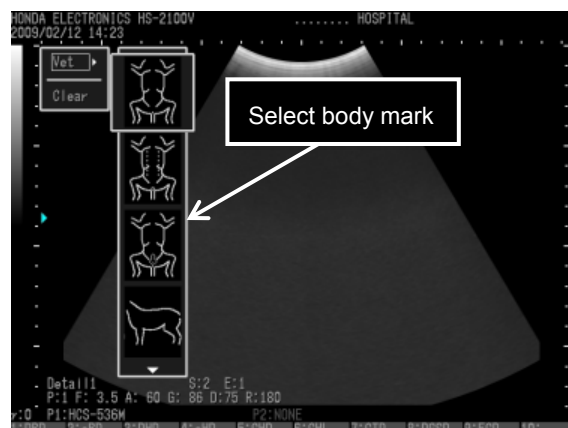
Set the **Manual** **A-Power**.

2.16 BODY MARK SETTINGS

This section describes how to set the body marks.

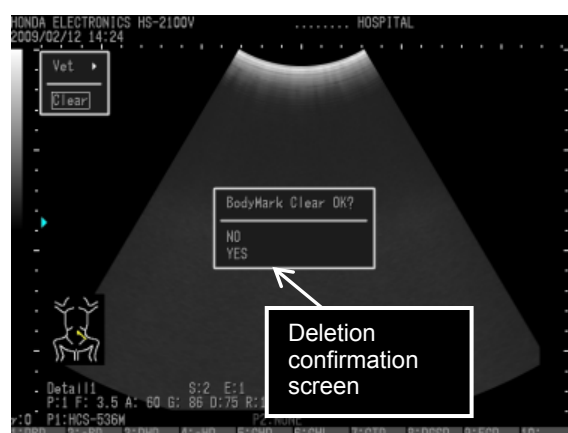
Body mark settings

1. Press the  key and the body mark menu will appear.
2. Use **SELECT** () and **SELECT** (ON) to select the body mark that is appropriate for the area being examined. The body mark is shown on the screen.
3. Use the trackball to determine the position of the probe mark and use **SELECT** () to set the angle of the probe mark.
4. Press the  key. The position of the probe mark and its angle have now been set.



Deleting a body mark

1. Press the  key and the body mark menu will appear.
2. Use **SELECT** () to select **Clear**. Press **SELECT** (ON) to execute.
3. The body mark deletion confirmation screen will appear.
NO :The body mark is not deleted and the normal screen display is restored.
YES: The body mark is deleted.



The body mark cannot be deleted using the  or  keys.
Probe Mark can be relocated after fixing it. Press and hold  key to do so.

2.17 ENTERING COMMENTS

This section describes how to enter annotations onto the ultrasound image.

Note that with the initial settings, the annotations are removed when freeze mode is cancelled.



Press the **(ABC)** key for one second. Select **Clear all annotations after unfreezing[off]** and the annotations will not be removed when freeze mode is cancelled.

Entering Annotations

1. Press the **(ABC)** key and the annotation menu will appear.

2. Use **SELECT** (↶) to select **Word**. Press **SELECT** (ON) to execute.

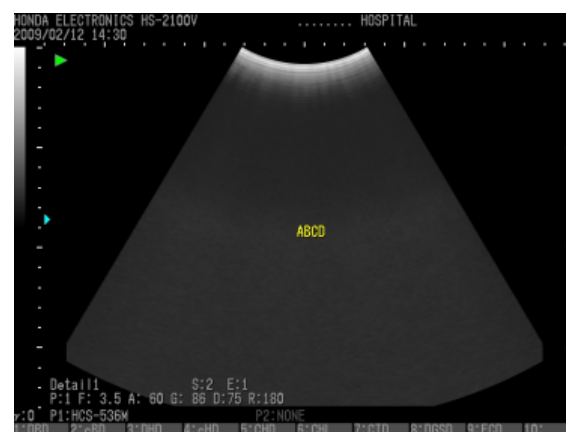
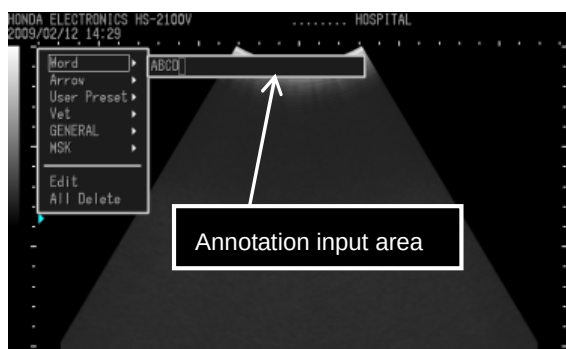


Above process can be altered by pressing **(ABC)** key once again.

3. Use the character input keys to enter a comment.

4. Press the **(FIX)** key and entered annotation will appear on the screen.

5. Use the trackball to position the annotation and press then press the **(SET)** key.



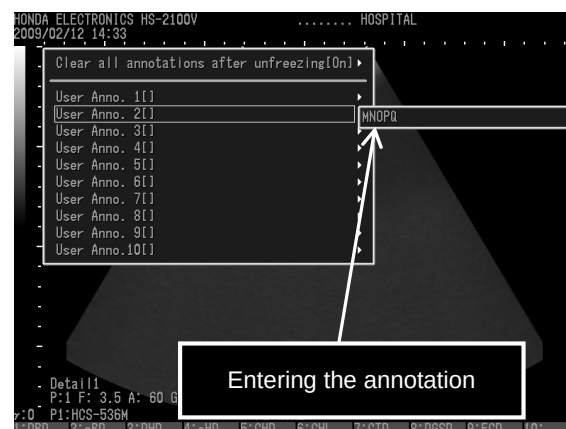
Saving Annotations

1. Press the **(ABC)** key for one second and the annotation save menu will appear.

2. Use **SELECT** (↶) to select the location to save the annotation. (User Anno. 1 to User Anno. 10) and press the **SELECT** (ON) key.

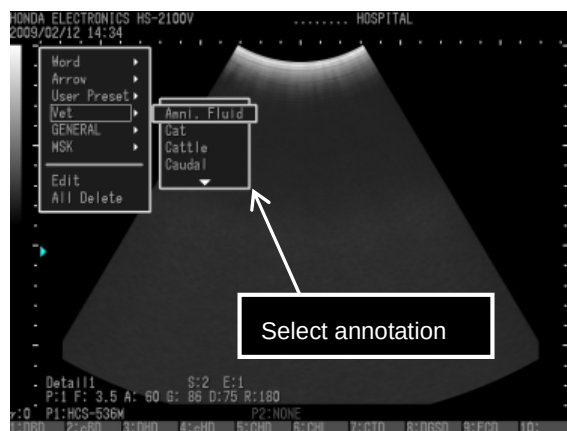
3. After entering the annotation with the character keys, press the **(FIX)** key to confirm.

4. Press the **(ABC)** key to close the menu.



Selecting an Annotation

1. Press the **(ABC)** key and the annotation menu will appear.
2. Use **SELECT** ($\curvearrowright$) to select the desired item (other than Word). Press **SELECT** (ON) to execute.
3. **SELECT** ($\curvearrowright$) Use **SELECT** ($\curvearrowright$) to select the annotation to be used. Press **SELECT** (ON) and the selected annotation will appear on the screen.



4. Use the trackball to position the annotation and press then press the **(SET)** key.



It is also possible to select an annotation that has already been saved.

Press the **(ABC)** key and select **User Preset**.

The annotations saved as User Anno. 1 to User Anno. 10 will be displayed. Select the annotation to be used.

Correcting an Annotation

1. Press the **(ABC)** key and the annotation menu will appear.
2. Use **SELECT** ($\curvearrowright$) to select **Edit**. Press **SELECT** (ON) to execute.



Above process can be altered by pressing **[E]** key.

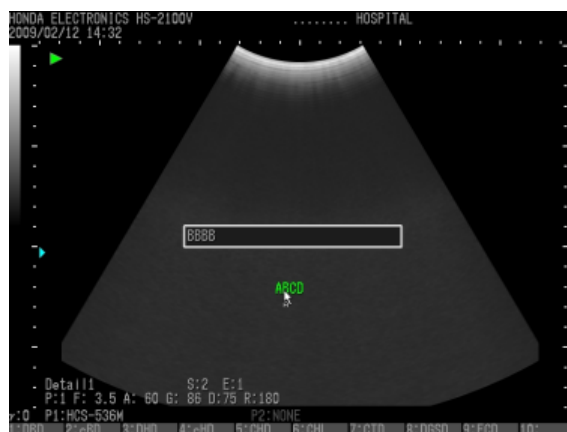
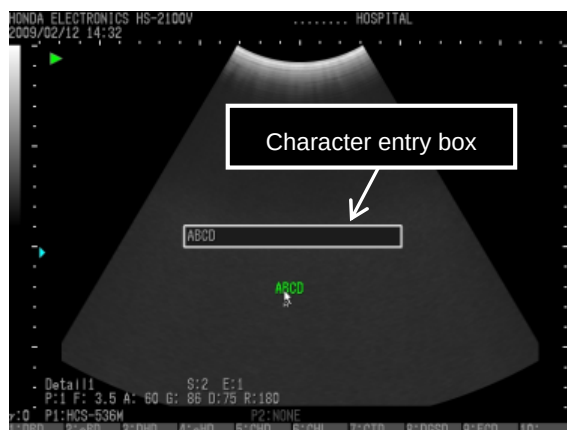
3. The $\blacktriangle$ cursor will be displayed on the screen.

Use the trackball to move the cursor $\blacktriangle$ to the annotation to be corrected. (The color of annotation will change from yellow to green.)

Press the **(SET)** key.

4. Press the **(ABC)** key and the character entry box will appear. The annotation to be corrected will appear inside the box.
5. When the annotation has been corrected,

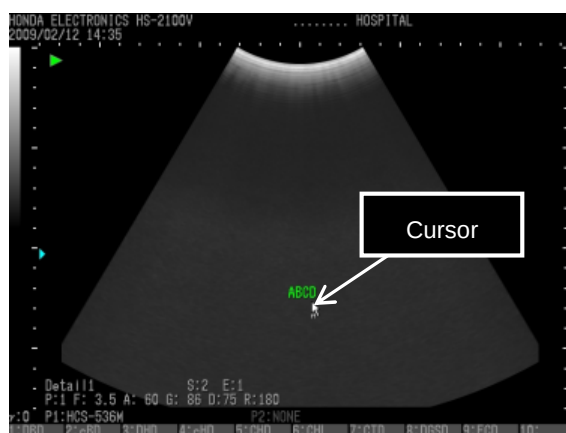
press the **(SET)** key. The corrected annotation will appear on the screen.



- Use the trackball to position the annotation and press then press the **SET** key.

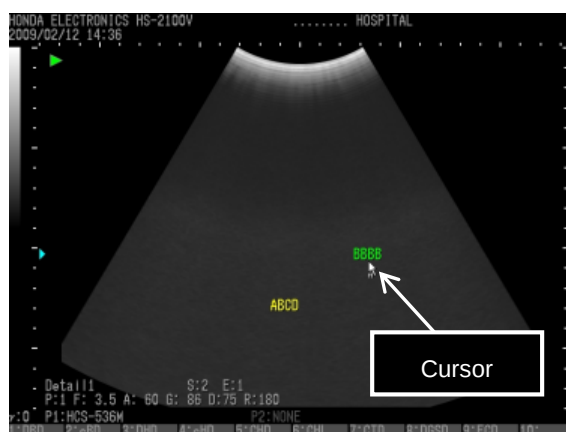
Moving an Annotation

- Press the **ABC** key and the annotation menu will appear.
- Use **SELECT** (↶) to select **Edit**. Press **SELECT** (ON) to execute.
- The cursor will be displayed on the screen. Use the trackball to move the cursor to the annotation to be moved. (The color of annotation will change from yellow to green.) Press the **SET** key. Use the trackball to move both the cursor and comment.
- When the annotation has been moved to the desired location, press the **SET** key once again.



Deleting Annotations

- Press the **ABC** key and the annotation menu will appear.
- Use **SELECT** (↶) to select **Edit**. Press **SELECT** (ON) to execute.
- Use the trackball to move the cursor to the annotation to be deleted. (The color of annotation will change from yellow to green.) Press the **SET** key.
- Press the **⊗** key and the annotation that has turned green will be deleted.



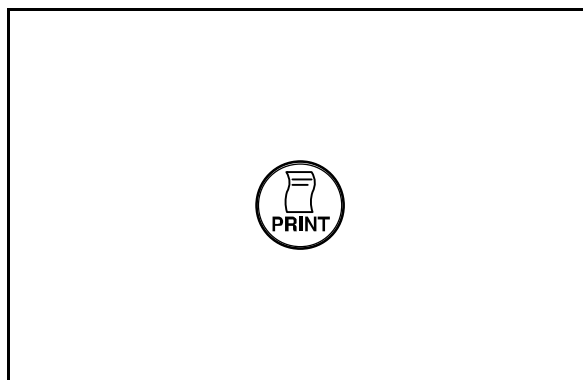
To delete all annotations, press the **ABC** key and select **All Delete**.

2.18 PRINTING OUT IMAGE

This section describes the printing out of the image.

Before printing, freeze the examination screen and confirm that the proper image has been acquired.

1. Press the  key. The ultrasound image data displayed on the screen is immediately transmitted to the video printer before printout. Therefore, the examination may be continued without any interval.



Make sure to connect the remote cable to print using the  key.



Pressing  key and SHIFT key together while the USB memory in the port can save a screen image in the root folder of the USB memory.

2.19 SETTING M-SPEED

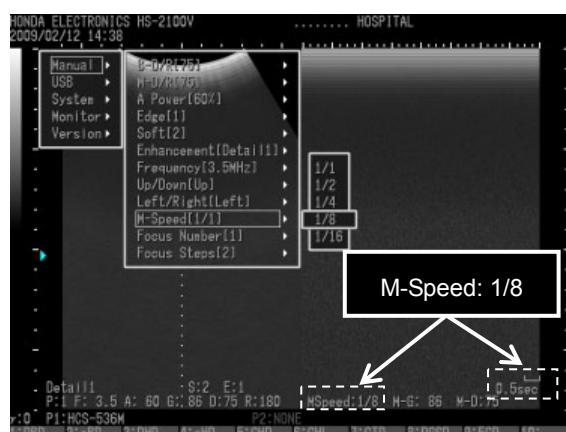
This section describes the settings for the M-mode scroll speed.

1. Press the  key. The main menu appears on the screen.
2. Use **SELECT** () to select the **Manual**-**M-Speed** menu. Press **SELECT** (ON) to execute.

3. Set the M- speed.

The speed can be selected from among five levels: 1/1, 1/2, 1/4, 1/8 and 1/16.

Use **SELECT** () to make the desired setting selection.

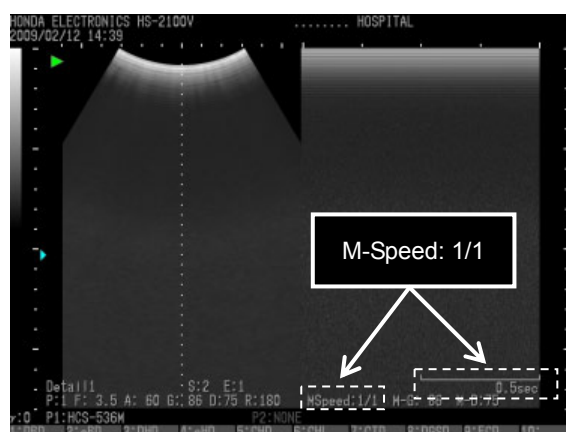


4. Press **SELECT** (ON) to set the speed.

Press the  key to close the menu.



Either the B/M-mode and M-mode can be set in the same manner.



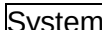
M speed can be changed one by one as follows, 1/1, 1/2, 1/4, 1/8, and 1/16, by pressing the **S** key.

2.20 DISPLAYING THE M-SCALE

This section describes the settings for displaying the scale on M-mode and Mode of the B/M mode screen.

Once the M-scale setting has been set, it will be saved even if the power is turned off.

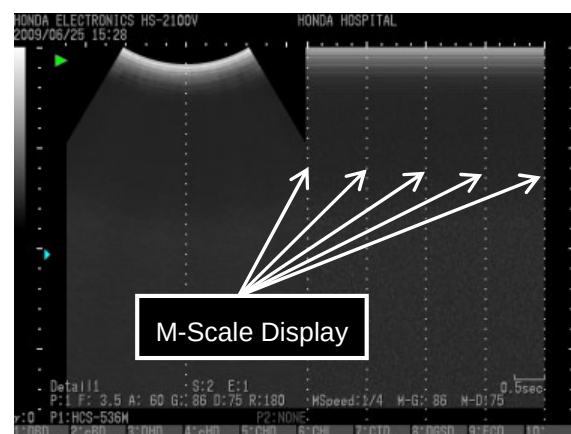
1. Press the  key. The main menu appears on the screen.

2. Use **SELECT** () to select the **System**  **M Scale Display** menu. Press **SELECT** (ON) to execute.



3. Set on/off for the display of the M-scale.
Select either **On** (Display) or **Off** (No Display).
Use **SELECT** () to make the desired setting selection.

4. Press **SELECT** (ON) and the selection is set.
Press the  key to close the menu.



When M-Scale is On



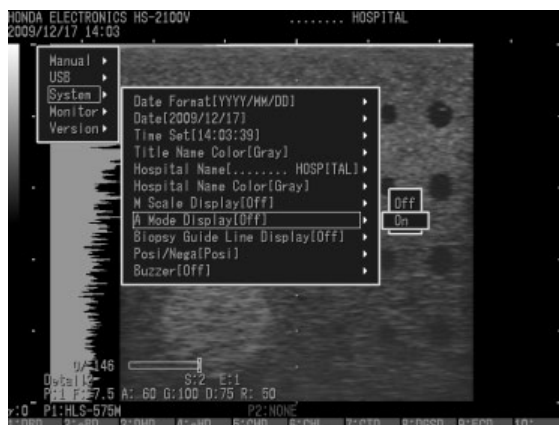
When the M-Scale is set to **On**, the scale (1 sec. / div.) will be displayed on the M-mode screen .

2.21 DISPLAYING A MODE

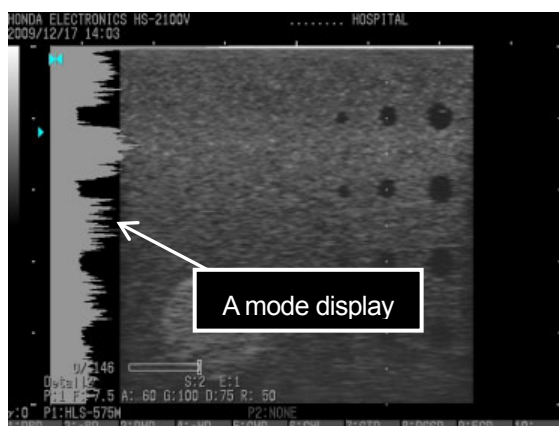
This item describes how to display A mode pattern on the B screen. A mode setting is protected even if the power is turned off.

1. Press the  key. Main menu appears on the screen.

2. Use **SELECT** () to select **System** - **A Mode Display** on menu, press **SELECT** (ON) to execute.



3. Set on/off for the A mode display.
Select either **On** (Display) or **Off** (No Display).
Use **SELECT** () to make the desired setting selection.



When A mode display is On

5. When A mode is ON, a signal level (an echo level) on the dotted line of the B mode screen is displayed as A mode graph. Use **SELECT** () to change dotted line position.



A mode can be displayed only when the image is in the freeze mode. The display disappears once when the freeze mode is released, and it appears again when it freezes again.

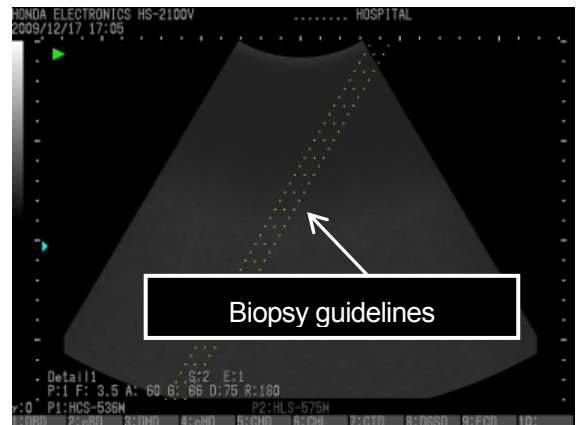
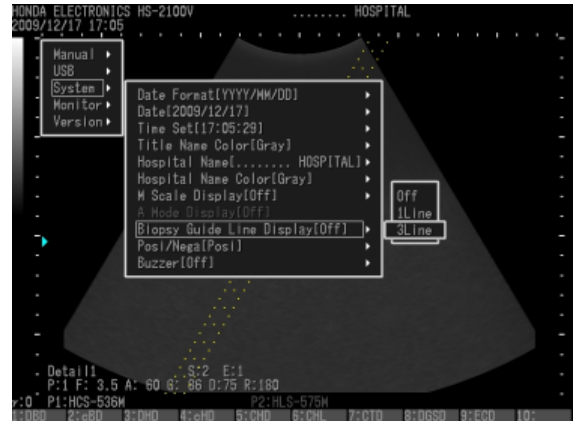


A mode wave display can be changed by pressing **CTRL** and **A** keys at a same time instead of above operation.

2.22 DISPLAYING BIOPSY GUIDE LINE

This item describes how to display biopsy guide line on the B mode screen.
Display setting is protected even if the power is turned off.

1. Press the **MENU** key. Main menu appears on the screen.
2. Use **SELECT** (↶) to select **System** - **Biopsy Guide Line Display** on menu, press **SELECT** (ON) to execute.
3. Set biopsy guide line display.
Select one among followings, **Off** (non display) · **1Line** · **3Line**.
Use **SELECT** (↶) to make the desired setting selection.
4. Press **SELECT** (ON) and the selection is set.
Press the **MENU** key to close the menu.



Biopsy guide lines on 3Line setting



This function is effective only in a probe which option is set.



Biopsy guide line is displayed at the corresponding place on the B mode screen when biopsy guideline is set on **1Line** or **3Line**.



Display - **Off** (non display), **1Line**, **3Line** - can be changed by pressing **CTRL** and **G** keys at a same time instead of above operation.

2.23 ENHANCEMENT FUNCTION SELECTION

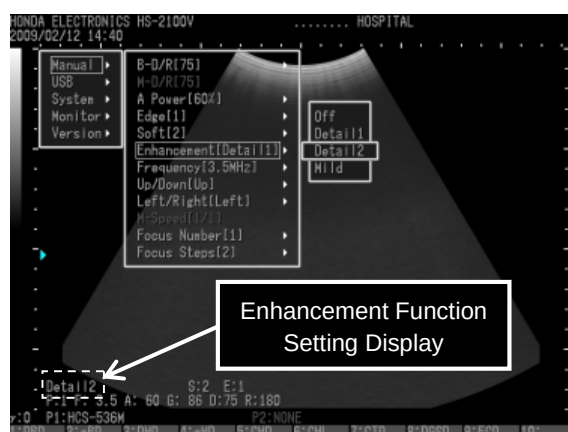
This section describes the selection of the enhancement function (image processing).
Use the following procedure to select the best image processing for the examination.

This function is already assigned to key **1** (During Scan).

1. Press the **1** key. Each time the key is pressed, the image processing function will change.
The currently selected condition will appear on the screen.

Use the following procedure to operate by using the menu.

1. Press the **MENU** key. The main menu appears on the screen.
2. Use **SELECT** (↶) to select the **Manual-Enhancement** menu. Press **SELECT** (ON) to execute.
3. Select the enhancement function.
Use **SELECT** (↶) to select and press **SELECT** (ON).
Press the **MENU** key to close the menu.



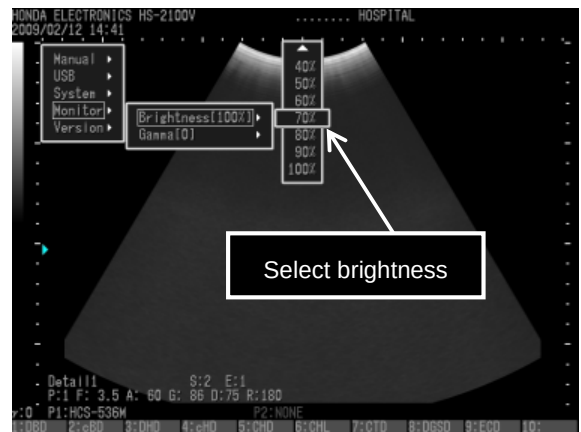
2.24 SCREEN BRIGHTNESS ADJUSTMENT

This section describes setting the brightness of the screen.

Once the brightness setting has been set, it will be saved even if the power is turned off.

1. Press the  key. The main menu appears on the screen.
2. Use **SELECT** () to select the **Monitor**-**Brightness** menu. Press **SELECT** (ON) to execute.
3. Use **SELECT** () to change the brightness of the screen. Select the desired brightness and press **SELECT** (ON).

Press the  key to close the menu.



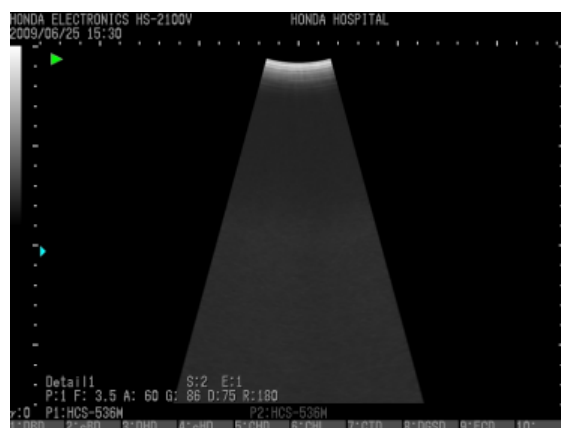
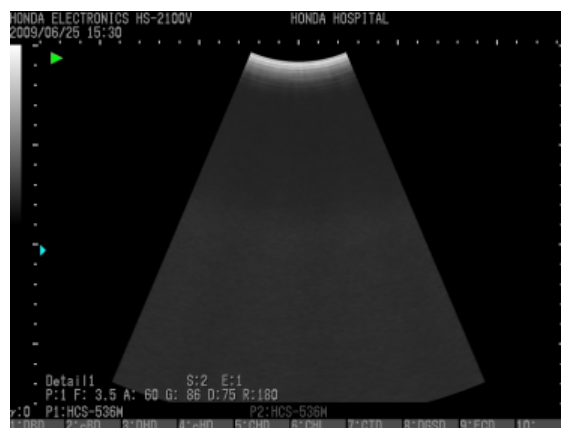
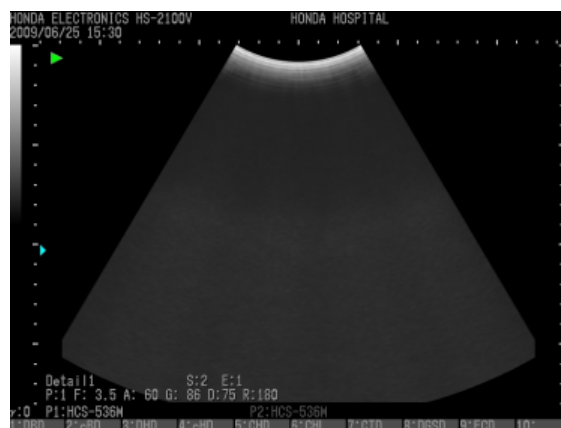
2.25 CHANGING VIEW ANGLE / VIEW WIDTH

This section describes how to change view angle or view width.

1. Press a left/right inversion key (Either the  or  key). The view angle (convex scope) or view width (linear scope) of the ultrasound image being displayed on the current screen will change in the following sequence:
1/1→3/4→1/2→1/1.

Use the following procedure to operate by using the menu.

1. Press the  key. The main menu appears on the screen.
2. Use **SELECT** () to select the **Manual-View** **Width** menu. Press **SELECT** (ON) to execute. Press the  key to close the menu.



When the image is in the freeze mode, switching between view angle and view width will not be performed even if the button is pushed.

--MEMO--

CHAPTER 3 MEASURING FUNCTIONS

This chapter describes how to make various measurements, such as distance and peripheral length.

There is a need to freeze the image before taking these measurements.

(Measurements cannot be taken during scanning.)

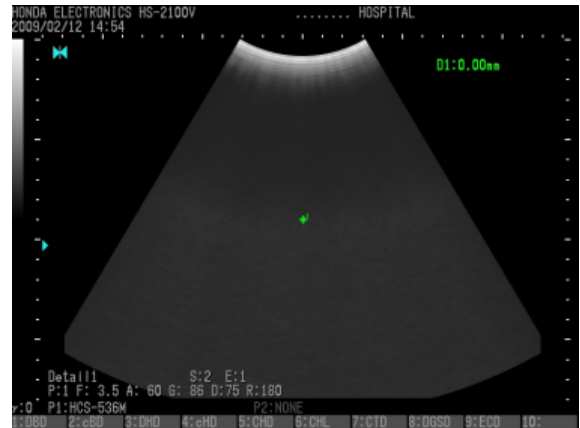
3.1 DISTANCE MEASUREMENT

This section describes the distance measurement method.

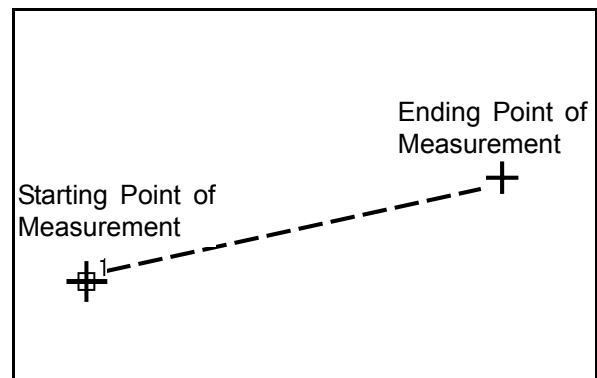
1. Press the $\oplus$ key. The $\oplus^1$ cursor will be displayed in the middle of the screen and D1:0.0 mm will appear in upper right corner of the screen.



The measurement scale of B/B mode is taken from the side where the $\oplus^1$ cursor locates.



2. Use the track ball to move the cursor to the start of the measurement (start point) and press the SET key.
3. Use the trackball to move the cursor from the start point and a green line will appear. (The tentative results of the measurement appear in green.)
4. Use the track ball to move the cursor to the end of the measurement (end point) and press the SET key.
5. The line will change to yellow and the results of the measurement will be displayed in yellow. It is possible to make distance measurements to eight locations continuously. The $\oplus^2$ cursor will flash as the measurements are continued.



Use the SET key to set the same type of measurement one step at a time. When the maximum number of locations has been measured (for example, eight lines) the original caliper is restored and can be reset.



Fine adjustment of the cursor position in the up/down and right/left directions can be performed in one dot increments by pressing the arrow key. Refer to "3.10 CURSOR FINE ADJUSTMENT FUNCTION".



When the measurement has been confirmed, press the **FIX** key.



key

The measurement contents will be deleted in the following order when the key is pressed when in the measurement mode.



- ① If a measurement has been taken during the measurement operation, only that measurement will be deleted. .
- ② If no measurement has been taken during the measurement operation and there are two or more types of measurements (such as distance measurement and area/circumference, that last measured system is deleted. (For example, if the sequence of measurement was distance and then area/circumference, all area/circumference measurements will be deleted.)

If the key is pressed after ① and ② above have been executed, all remaining measurements will be deleted.



When the Average of Distance Display is on, all enabled distances shown on the screen will be average values. (AV: mm)

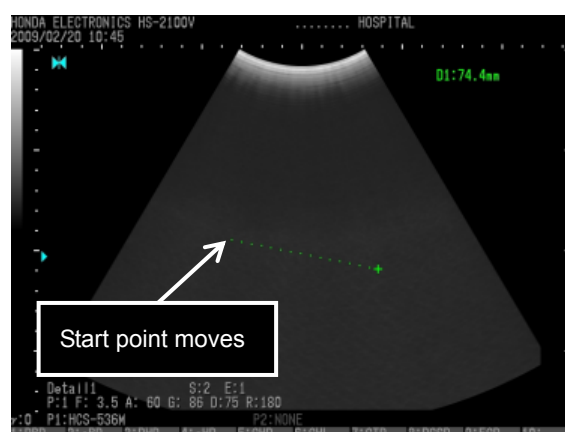
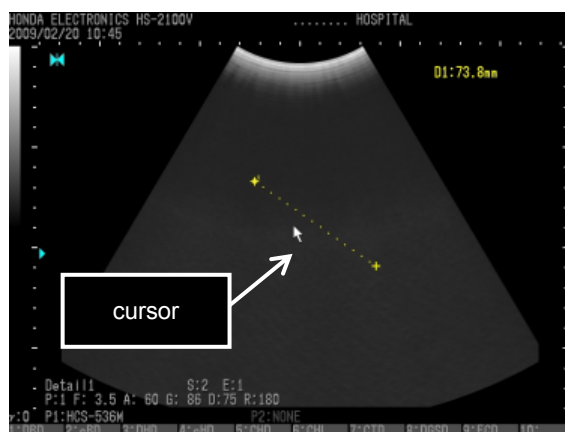


It is possible to change the line being displayed at the time of measurement (the spacing of the dots in the line) and whether or not the average value is displayed. Refer to “3.11 DISPLAYS RELATING TO MEASUREMENT AND OTHER SETTINGS”.

Correcting measurements

It is possible to correct a measurement that has been set.

1. Hover the cursor on the fixed measurement line or numeric result. The line and the measurement result change its color from yellow to green. Press **SET** key to select the measurement.
2. Fixed measurement now can be corrected by trackball. Start and End point can be swapped by **SET** key.
3. Press the **FIX** key to complete the measurement.



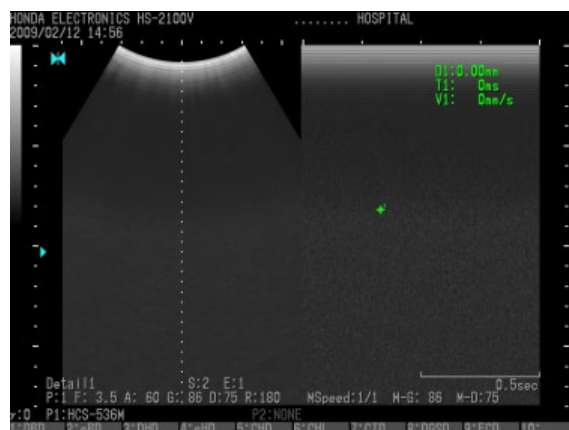
3.2 VELOCITY MEASUREMENT

This section describes the settings for displaying the velocity measurement on M-mode and M-mode of the B/M mode screen.

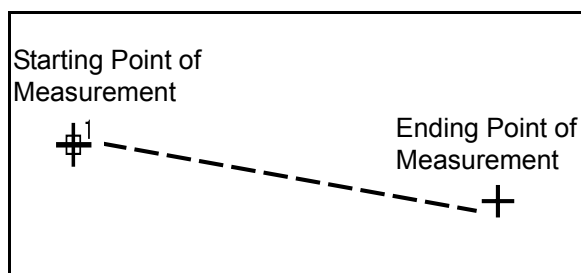
By operating the measurement cursor in the M-mode and M-mode of the B/M mode screen, measurement of the mitral valve and other items is preformed and the following information can be obtained.

- (1) Distance between the measuring cursors (Vertical direction): D (Movement distance of valve, etc.)
- (2) Time between the measuring cursor (Vertical direction): T (Time required for the mitral valve to open and close, etc.)
- (3) The velocity calculated from (1) and (2): V

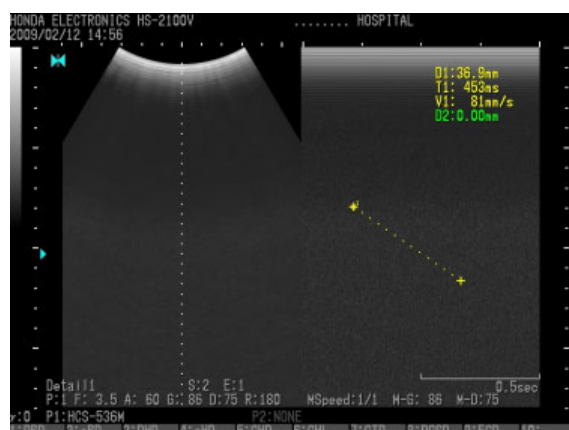
1. Press the $\oplus$ key and the $\oplus$ cursor will appear. The following will be displayed in the upper right side of the screen.
D 1 : 0.00 mm
T 1 : 0 ms
V 1 : 0 mm/s



2. Move the cursor to the start of the measurement (start point) and press the **SET** key.



3. Use the trackball to move the cursor and a green line will be displayed. (The tentative results of the measurement appear in green.)



4. Move the cursor to the end of the measurement (end point) and press the **SET** key. The line and results of the measurement will be displayed in yellow.



To end the current measurement, press the  key.



key

The measurement contents will be deleted in the following order when the  key is pressed when in the measurement mode.

- ① If a measurement has been taken during the measurement operation, only that measurement will be deleted. .
- ② If no measurement has been taken during the measurement operation and there are two or more types of measurements (such as distance measurement and area/circumference, that last measured system is deleted. (For example, if the sequence of measurement was distance and then area/circumference, all area/circumference measurements will be deleted.)

If the  key is pressed after ① and ② above have been executed, all remaining measurements will be deleted.



It is possible to change the line being displayed at the time of measurement (the spacing of the dots in the line) and whether or not the average value is displayed. Refer to "3.11 DISPLAYS RELATING TO MEASUREMENT AND OTHER SETTINGS".

3.3 CIRCUMFERENCE AND AREA MEASUREMENT



This measurement cannot be performed in M mode screen (include B/M mode).

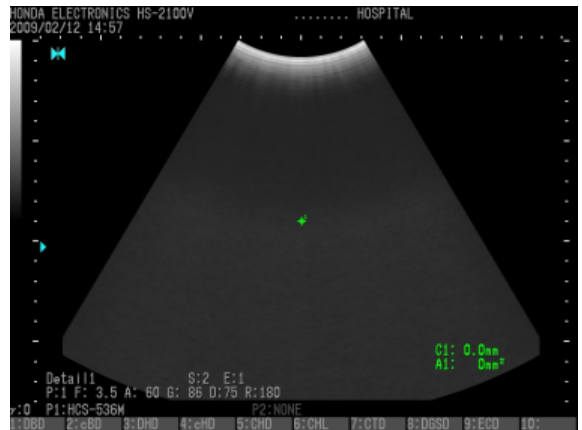
3.3.1 Circumference and Area measurement (Ellipse)

This section describes the measurement method of circumference and area in ellipse.

1. Press the key. The cursor will be displayed in the middle of the screen and the following will appear in the lower right side of the screen.

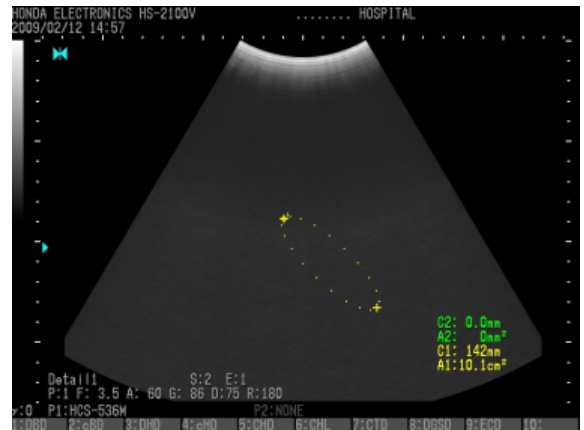
C 1 : 0.0 mm

A 1 : 0 cm²

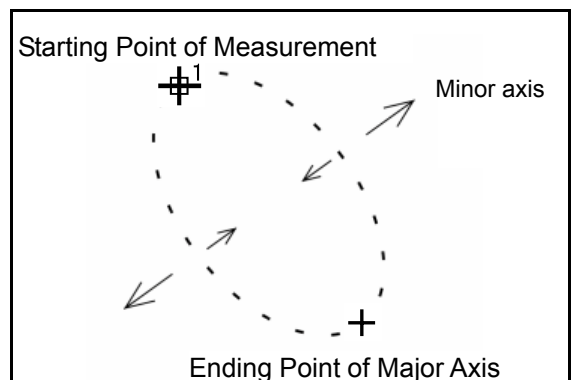


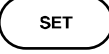
C= Circumference, A=Area

2. Move the cursor to the start of the measurement (start point) and press the key.
3. Use the trackball to move the cursor and a green line will be displayed. (The tentative results of the measurement appear in green.)



4. Move the cursor to the end of the measurement (end point) and turn the **RANGE** () key to change the minor axis of the ellipse.



5. Press the  key to complete the measurement. The ellipse and the results of the measurement will change to yellow. By pressing the  key instead of the  key, you can continue to make another set of circumferential measurements.



 key

The measurement contents will be deleted in the following order when the  key is pressed when in the measurement mode.

- ① If a measurement has been taken during the measurement operation, only that measurement will be deleted. .
- ② If no measurement has been taken during the measurement operation and there are two or more types of measurements (such as distance measurement and area/circumference, that last measured system is deleted. (For example, if the sequence of measurement was distance and then area/circumference, all area/circumference measurements will be deleted.)

If the  key is pressed after ① and ② above have been executed, all remaining measurements will be deleted.



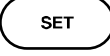
It is possible to change the line being displayed at the time of measurement (the spacing of the dots in the line) and whether or not the average value is displayed. Refer to "3.11 DISPLAYS RELATING TO MEASUREMENT AND OTHER SETTINGS".



Initially, the measurement mode is in "Ellipse". Please change the mode to Trace following the instruction described in 3.3.2.

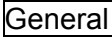
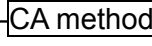
Correcting measurements

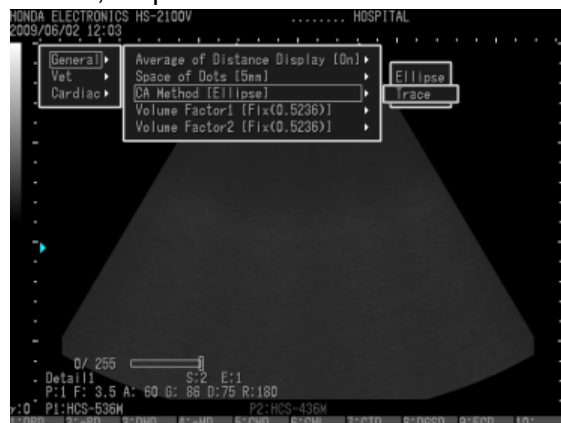
It is possible to correct a measurement that has been set.

1. Hover the cursor on the fixed measurement line or numeric result. The line and the measurement result change its color from yellow to green. Press  key to select the measurement.
2. Fixed measurement now can be corrected by trackball and **RANGE** . Start and End point can be swapped by  key.
3. Press the  key to complete the measurement.

3.3.2 Changing Method, Ellipse and Trace

This section describes how to change the measurement method, Ellipse and Trace.

1. Press and hold the  key.
2. Use **SELECT** () and **SELECT** (ON) to select   and press **SELECT** (ON).
3. Select Ellipse or Trace for the needs of measurement and press **SELECT** (ON)
4. Menu will be closed by pressing  key.



This setting is used for other C/A measurement, such as Fetal Age Diagnosis Programs.

3.3.3 Circumference and Area measurement (Trace)

This section describes the measurement method of circumference and area in ellipse.

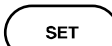
1. Press the  key. The  cursor will be displayed in the middle of the screen and the following will appear in the lower right side of the screen.

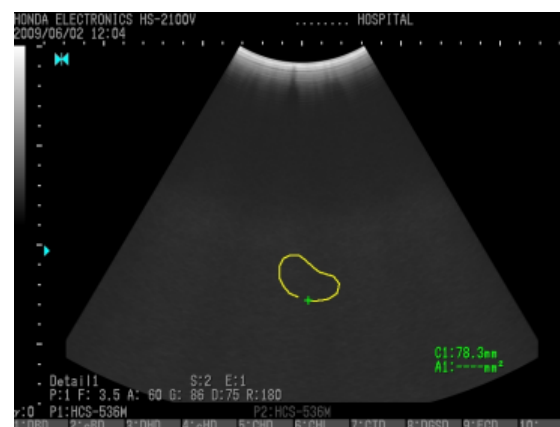
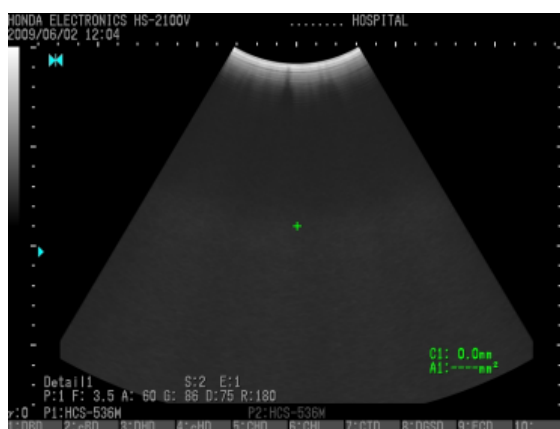
C 1 : 0.0 mm

A 1 : 0 cm²



C= Circumference, A=Area

2. Move the cursor to the start of the measurement (start point) and press the  key.
3. Use the trackball to move the cursor and a green line will be displayed. (The tentative results of the measurement appear in green.)



As the cursor moves, trace point will be created.



Each trace point is not set until the cursor moves several pixels (shown in green next to the cursor). In order to set trace point immediately, press key.



You can trace back the points by rotating **RANGE** .

4. Measurement will be completed by pressing key. The trace line will be closed and the color of the measurement changes from green to yellow.



If you press instead of key, another trace measurement will be activated.



Initially, the measurement mode is in "Ellipse". Please change the mode to Trace following the instruction described in 3.3.2.



key

The measurement contents will be deleted in the following order when the key is pressed when in the measurement mode.

- ① If a measurement has been taken during the measurement operation, only that measurement will be deleted. .
- ② If no measurement has been taken during the measurement operation and there are two or more types of measurements (such as distance measurement and area/circumference, that last measured system is deleted. (For example, if the sequence of measurement was distance and then area/circumference, all area/circumference measurements will be deleted.)

If the key is pressed after ① and ② above have been executed, all remaining measurements will be deleted.



It is possible to change the line being displayed at the time of measurement (the spacing of the dots in the line) and whether or not the average value is displayed. Refer to "3.11 DISPLAYS RELATING TO MEASUREMENT AND OTHER SETTINGS".

Correcting measurements

It is possible to correct a measurement that has been set.

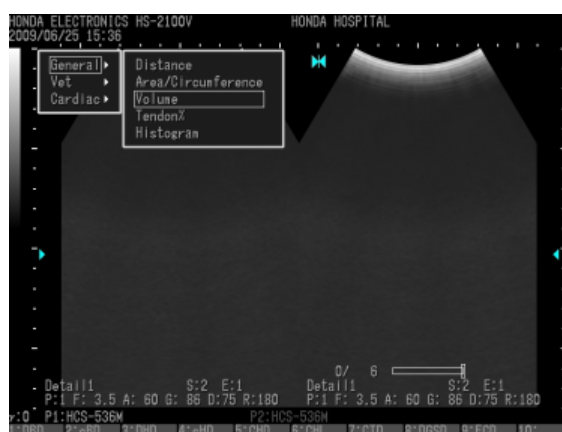
1. Hover the cursor on the fixed measurement line or numeric result. The line and the measurement result change its color from yellow to green. Press key to select the measurement.
2. Use **RANGE** to determine the point to change and retrace by trackball.
3. Press the key to complete the measurement.

3.4 ESTIMATING VOLUME

This device is equipped with a function that can be used to easily calculate the volume from the length, width and depth in order to find the volume of tissue or organs. (Calculation is based on length x width x depth x factor.) There is a need to measure by bisecting cross sections of the tissue or organ using the B/B mode in order to obtain an accurate measurement of the length, width and depth.

1. Press the  key and the measurement menu screen will appear.

2. Use **SELECT** () and **SELECT** (ON) to select **General** **Volume**. Press **SELECT** (ON) to execute. (Press the  key to move to the next higher menu item.)



3. The  cursor will appear and the following will appear on the right side of the screen.
DX1= 0.0mm

4. Move the cursor to the start of the measurement (start point) and press the  key.
5. Use the track ball to measure the length and press the  key. The  cursor will appear.
6. Measure the width and depth in the same way. Press the  key and the results of the measurement will appear on the right side of the screen.

DX1= 10.0 mm
DY1= 10.0 mm
DZ1= 10.0 mm
Fac. = 0.5236
Vol1 = 0.5 cm³



It is possible to change the Fac value.
Refer to "3.11 DISPLAYS RELATING TO MEASUREMENT AND OTHER SETTINGS".



By pressing the  key instead of the  key, you can start another set of volume measurements.

 key

The measurement contents will be deleted in the following order when the  key is pressed when in the measurement mode.

① If a measurement has been taken during the measurement operation, only that measurement will be deleted. .

② If no measurement has been taken during the measurement operation and there are two or more types of measurements (such as distance measurement and area/circumference, that last measured system is deleted. (For example, if the sequence of measurement was distance and then area/circumference, all area/circumference measurements will be deleted.)

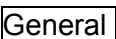
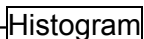
If the  key is pressed after ① and ② above have been executed, all remaining measurements will be deleted.



It is possible to change the line being displayed at the time of measurement (the spacing of the dots in the line) and whether or not the average value is displayed. Refer to "3.11 DISPLAYS RELATING TO MEASUREMENT AND OTHER SETTINGS".

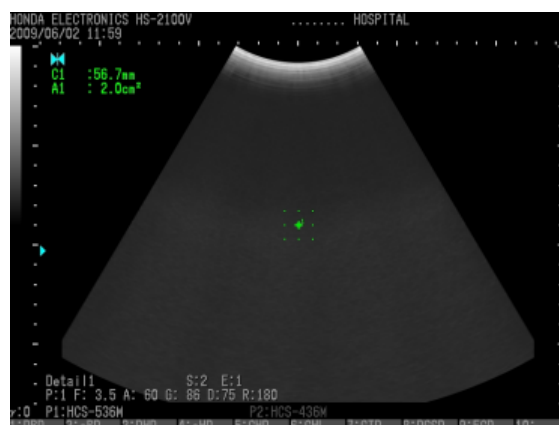
3.5 HISTOGRAM MEASUREMENT

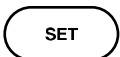
This section describes how to measure the histogram.

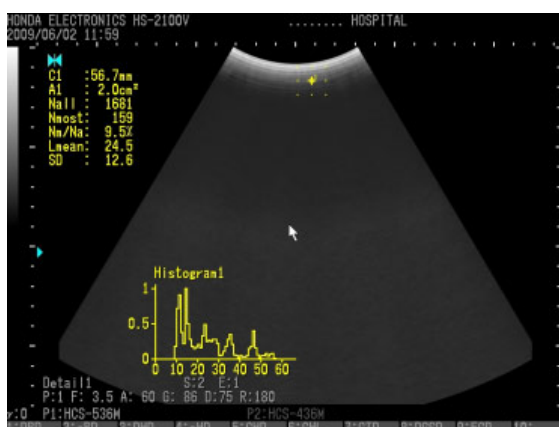
1. Press the  key and measurement menu appears.
2. Use **SELECT** () and **SELECT** (ON) to select **General**  **Histogram**  and press **SELECT** (ON).

A cursor and a box shape with below indication appears on the screen.

C 1 : **.* mm
A 1 : * mm²



3. Move the cursor to the center point of the interested area. Use **SELECT** () to adjust the size of the box.
4. Press  key to complete the measurement. One more histogram measurement can be done continuously by pressing  key.



C 1 : Circumference of the box
A 1 : Area of the box
Nall : Total pixel number in the box
Nmost : Most appearing pixel number
Nm/Na : Nmost / Nall
Lmean : Mean Level
SD : Standard Deviation



Pressing  for starting the second measurement, makes the box size equal to the first measurement. Actual box size may be different when the range setting is different.



key

The measurement contents will be deleted in the following order when the  key is pressed when in the measurement mode.

- ① If a measurement has been taken during the measurement operation, only that measurement will be deleted. .
- ② If no measurement has been taken during the measurement operation and there are two or more types of measurements (such as distance measurement and area/circumference, that last measured system is deleted. (For example, if the sequence of measurement was distance and then area/circumference, all area/circumference measurements will be deleted.)

If the  key is pressed after ① and ② above have been executed, all remaining measurements will be deleted.



It is possible to change the line being displayed at the time of measurement (the spacing of the dots in the line) and whether or not the average value is displayed. Refer to "3.11 DISPLAYS RELATING TO MEASUREMENT AND OTHER SETTINGS".

Correcting measurements

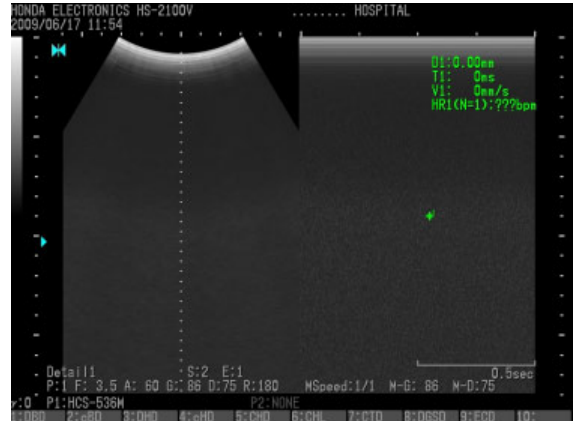
It is possible to correct a measurement that has been set.

1. Hover the cursor on the fixed measurement line or numeric result. The line and the measurement result change its color from yellow to green. Press  key to select the measurement.
2. Fixed measurement now can be corrected by trackball. Start and End point can be swapped by  key.
3. Press the  key to finish the measurement.

3.6 HEART RATE MEASUREMENT

This section describes how to measure the heart rate.
Use Freeze when taking the heart rate measurement.

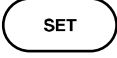
1. Press the  key, select **Cardiac-HR** and press **SELECT** (ON).
D1 : 0.00 mm
T1 : 0 ms
V1 : 0 mm/s
HR1 (N =) : ??? bpm is displayed.

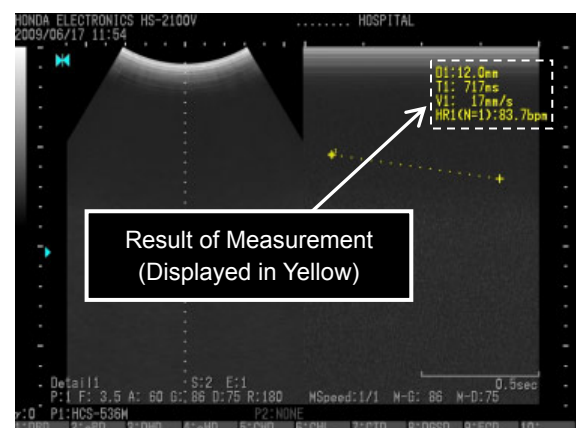
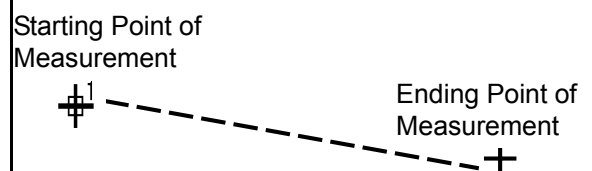


Above process can be altered by pressing **H** key.



N is the number of heart beats used when calculating the heart rate. It is possible to change the N setting.
Refer to "3.11 DISPLAYS RELATING TO MEASUREMENT AND OTHER SETTINGS".

2. Move the cursor to the start of the measurement (start point) and press the  key.
3. Use the trackball to move the cursor and a green line will be displayed. (The tentative results of the measurement appear in green.)
4. Move the cursor to the end of the measurement (end point) and press the  key or  key. The line will change to yellow and the results of the measurement will be displayed in yellow.





key

The measurement contents will be deleted in the following order when the  key is pressed when in the measurement mode.

① If a measurement has been taken during the measurement operation, only that measurement will be deleted. .

② If no measurement has been taken during the measurement operation and there are two or more types of measurements (such as distance measurement and area/circumference, that last measured system is deleted. (For example, if the sequence of measurement was distance and then area/circumference, all area/circumference measurements will be deleted.)

If the  key is pressed after ① and ② above have been executed, all remaining measurements will be deleted.



It is possible to change the line being displayed at the time of measurement (the spacing of the dots in the line) and whether or not the average value is displayed. Refer to “3.11 DISPLAYS RELATING TO MEASUREMENT AND OTHER SETTINGS”.

Correcting measurements

It is possible to correct a measurement that has been set.

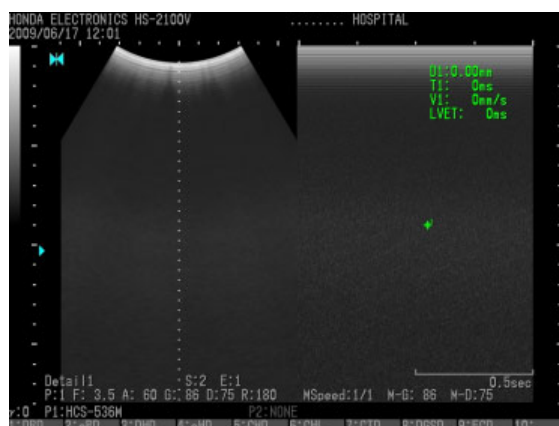
1. Hover the cursor on the fixed measurement line or numeric result. The line and the measurement result change its color from yellow to green. Press  key to select the measurement.
2. Fixed measurement now can be corrected by trackball. Start and End point can be swapped by  key.
3. Press the  key to finish the measurement.

3.7 LVET MEASUREMENT

This section describes how to measure LVET (left ventricular ejection time).
This measurement can only be done on M mode screen including B/M mode.

1. Press the  key, select **Crdiac**-**LVET** and press **SELECT** (ON).

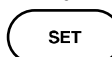
D 1 : 0.00 mm
T 1 : 0 ms
V 1 : 0 mm/s
LVET: 0ms is displayed.

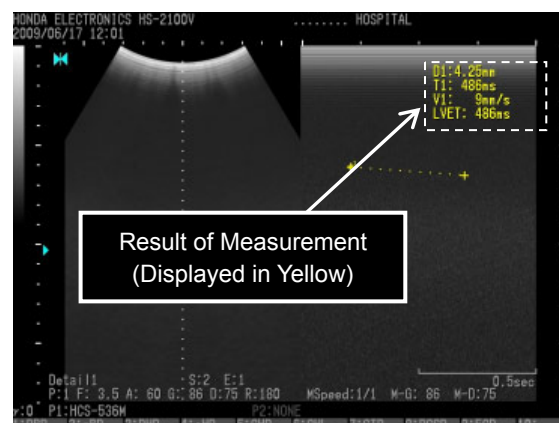


2. Move the cursor to the start of the measurement (start point) and press the  key.
3. Use the trackball to move the cursor and a green line will be displayed. (The tentative results of the measurement appear in green.)

4. Move the cursor to the end of the measurement (end point) and press  key.

The line and the results of the measurement will change to yellow.

Pressing  key will activate another LVET measurement.



It is possible to change the line being displayed at the time of measurement (the spacing of the dots in the line) and whether or not the average value is displayed. Refer to "3.11 DISPLAYS RELATING TO MEASUREMENT AND OTHER SETTINGS".



key

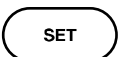
The measurement contents will be deleted in the following order when the  key is pressed when in the measurement mode.

- ① If a measurement has been taken during the measurement operation, only that measurement will be deleted. .
- ② If no measurement has been taken during the measurement operation and there are two or more types of measurements (such as distance measurement and area/circumference, that last measured system is deleted. (For example, if the sequence of measurement was distance and then area/circumference, all area/circumference measurements will be deleted.)

If the  key is pressed after ① and ② above have been executed, all remaining measurements will be deleted.

Correcting measurements

It is possible to correct a measurement that has been set.

1. Hover the cursor on the fixed measurement line or numeric result. The line and the measurement result change its color from yellow to green. Press  key to select the measurement.
2. Fixed measurement now can be corrected by trackball. Start and End point can be swapped by  key.
3. Press the  key to finish the measurement.

3.8 LV MEASUREMENT

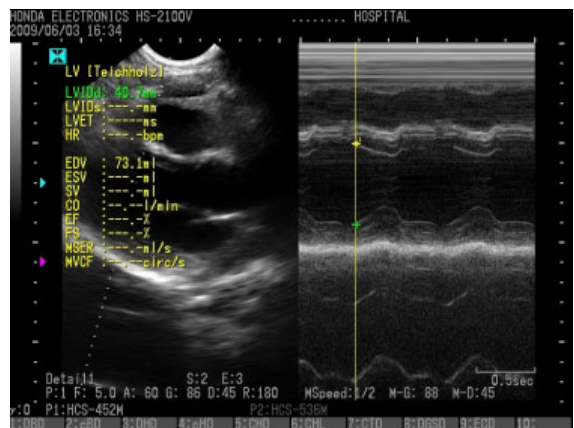
This section describes how to measure LV (left ventricular).

This measurement can only be done on M mode screen including B/M mode.

1. Press the  key, select **Cardiac-LV** and press **SELECT** (ON).

A cursor,  will appear at the center of the M mode screen.

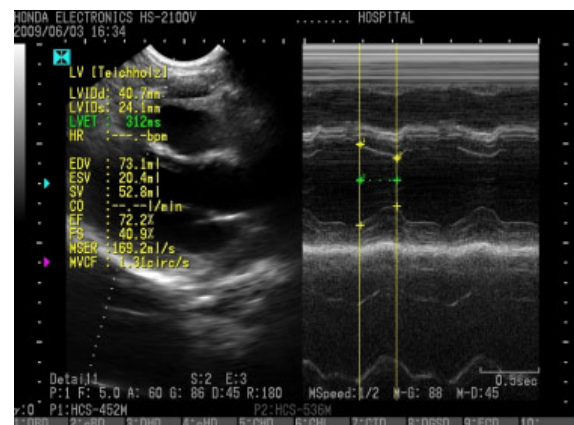
2. Move the cursor to the start point of the LVIDd measurement (left ventricular internal dimension diastolic) and press the  key.



3. Move the cursor on the fixed vertical line to measure the internal diameter.

4. Another cursor will appear on the screen. Measure LVIDs measurement (left ventricular internal dimension systolic) in a same manner as above.

5. Another cursor will appear to measure LVET (left ventricular ejection time). Measure the time using track ball and  key to complete.



If LVET measurement (3.7 LVET MEASUREMENT) has been performed beforehand, the result will be shown. You can use this result by pressing  key.

If you press  key, you may enter numeric value directly by keyboard.

6. Another cursor will appear for Heart rate measurement.

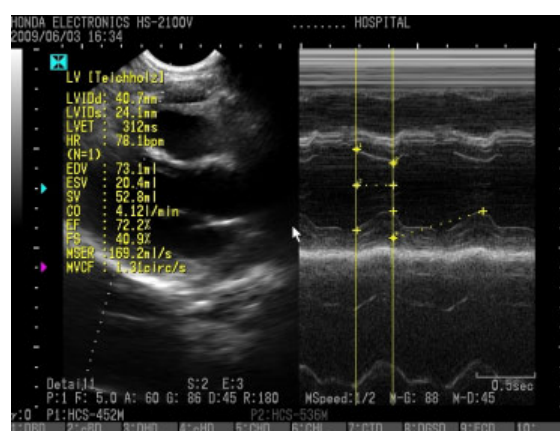


If Heart rate measurement (3.6 HEART RATE MEASUREMENT) has been performed beforehand, the result will be shown. You can use this result by pressing **FIX** key.

If you press **ABC** key, you may enter numeric value directly by keyboard.

7. When all measurement completed following result will be shown.

Display	Description
LVIDd	left ventricular internal diameter diastole
LVIDs	left ventricular internal diameter systole
LVET	left ventricular ejection time
HR	heart rate
N	number of heart beat
EDV	end diastolic volume
ESV	end systolic volume
SV	stroke volume
CO	cardiac output
EF	ejection fraction
FS	fractional shortening
MSER	mean systolic ejection rate
MVCF	mean velocity of circumferential fiber shortening



Measurement method can be changed. Press and hold **CALC. MENU** key and select the method from **Cardiac** - **LV Method**.



It is possible to change the line being displayed at the time of measurement (the spacing of the dots in the line) and whether or not the average value is displayed. Refer to "3.11 DISPLAYS RELATING TO MEASUREMENT AND OTHER SETTINGS".

Correcting measurements

It is possible to correct a measurement that has been set.

1. Hover the cursor on the fixed measurement line or numeric result. The line and the measurement result change its color from yellow to green. Press  key to select the measurement.
2. Fixed measurement now can be corrected by trackball. Start and End point can be swapped by  key.
3. Press the  key to finish the measurement.

3.9 Tendon% MEASUREMENT

This section describes how to measure Tendon%.

1. Press the  key, select **General** **Tendon%** and press **SELECT (ON)**.

A cursor,  will appear at the center of the screen.

C 1: 0.0 mm

A 1: 0 cm²



A=Area

2. In the same manner as Circumference and Area Measurement, measure the area of entire tendon.



Please refer “3.3 Circumference and Area Measurement” how to perform the measurement.
Ellipse or Trace method can be used. Please refer “3.3.2 Changing method, Ellipse and Trace”.

3. After finishing the entire area, another cursor will appear. Please measure the problem region in the same manner.

4. Following result will be displayed.

Move the cursor on the fixed vertical line to measure the internal diameter.

A1: Entire area

A2: Problem area

Tendon%1: Percentage of the problem area among the entire area



Initially, the measurement mode is in “Ellipse”. Please change the mode to Trace following the instruction described in 3.3.2, if necessary.



key

The measurement contents will be deleted in the following order when the  key is pressed when in the measurement mode.

- ① If a measurement has been taken during the measurement operation, only that measurement will be deleted. .
- ② If no measurement has been taken during the measurement operation and there are two or more types of measurements (such as distance measurement and area/circumference, that last measured system is deleted. (For example, if the sequence of measurement was distance and then area/circumference, all area/circumference measurements will be deleted.)

If the  key is pressed after ① and ② above have been executed, all remaining measurements will be deleted.

Correcting measurements

The resulted measurement can be corrected. The procedure differs by the method (Ellipse or Trace) you choose. Please refer 3.3 Circumference and Area Measurement for the detail.

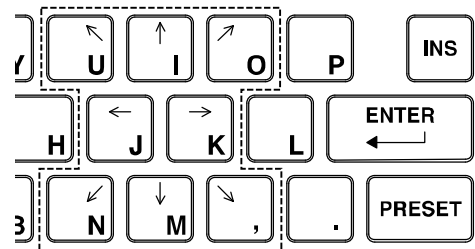
3.10 CURSOR FINE ADJUSTMENT FUNCTION

This section describes how to make fine adjustments of the measurement cursor.

1. It is possible to make fine adjustments to the cursor position with the arrow keys (, , , , , , , ) before setting the position of the measuring cursor.



This function can only be used during measurement.



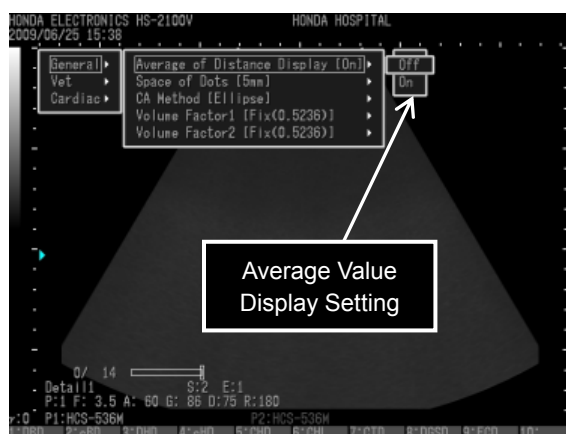
Cursor Fine Adjustment Keys

3.11 DISPLAYS RELATING TO MEASUREMENT AND OTHER SETTINGS

This section describes displays relating to measurement and other settings.

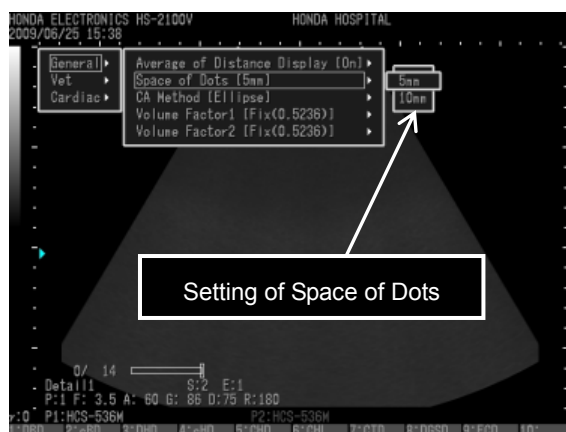
Display of Average Value

1. Press the  key for one second and the measurement setting menu will appear.
2. Use **SELECT** (↶) and **SELECT** (ON) to select **General** **Average of Distance Display**.
Press **SELECT** (ON) to execute.
3. Use **SELECT** (↶) to select On to display the average value or Off to not display it and then press **SELECT** (ON) .
4. Press the  key to close the menu.



Space of Dots

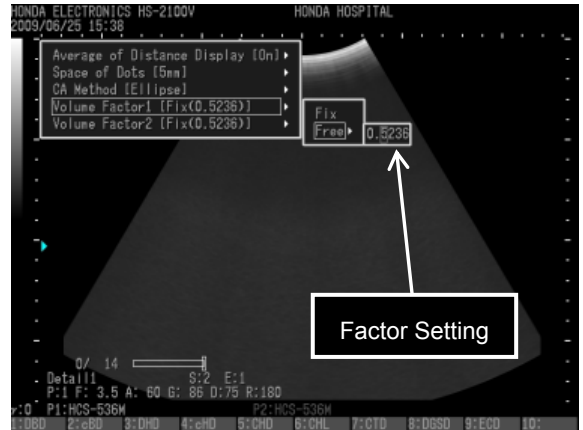
1. Press the  key for one second and the measurement setting menu will appear.
2. Use **SELECT** (↶) and **SELECT** (ON) to select **General** **Space of Dots**.
Press **SELECT** (ON) to execute.
3. Use **SELECT** (↶) to select the desired gap between dots and then press **SELECT** (ON) .
4. Press the  key to close the menu.



Selection can be made between two dot spacings: **5 mm** and **10 mm**.

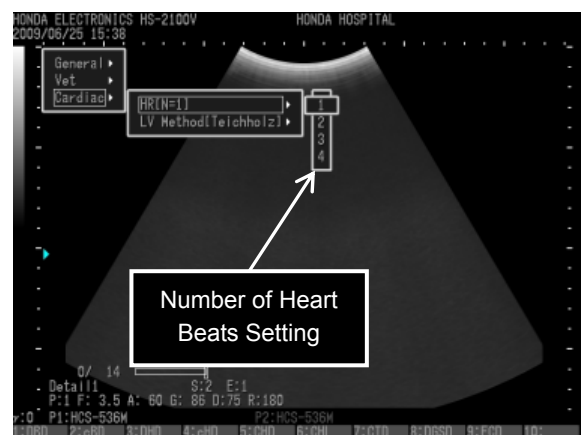
Setting the Factor Used in Calculating Volume

1. Press the  key for one second and the measurement setting menu will appear.
2. Use **SELECT**() and **SELECT**(ON) to select **General** | **Volume Factor**.
Press **SELECT**(ON) to execute.
3. To use the fixed value (0.5236), use **SELECT**() to select Fix and press **SELECT**(ON).
4. To set the factor, use **SELECT**() and **SELECT**(ON). After selecting Free, use the number key to enter the four digits after the decimal point and press **SELECT**(ON).
5. Press the  key to close the menu.



Setting the Heart Beat Number Used in the Heart Rate Calculation

1. Press the  key for one second and the measurement setting menu will appear.
2. Use **SELECT**() and **SELECT**(ON) to select **General** | **Measured Heartbeat**.
Press **SELECT**(ON) to execute.
3. Use **SELECT**() to select the number of heart beats to be used in the heart rate calculation and press **SELECT**(ON).
4. Press the  key to close the menu.



--MEMO--

CHAPTER 4 FETAL AGE DIAGNOSIS PROGRAMS

This chapter describes how to use the fetal age diagnosis programs for animals that are incorporated into this device.

If fetal diagnosis (measurement) is going to be performed, the image must first be in freeze mode. (Fetal diagnosis cannot be performed during scanning.)

4.1 FETAL AGE TABLE

The fetal diagnosis program includes the weeks since conception table (fetal age table).

Table Name	Name	Cal. Method	Available Measurement Range
HORSE	ESD	Equine Sac Diameter	6mm to 60mm
	ECD	Equine Conceptus Diameter	14mm to 75mm
CATTLE	CTD	Cattle Trunk Diameter	15mm to 122mm
	CHL	Cattle Head Length	22mm to 145mm
	CHD	Cattle Head Diameter	15mm to 85mm
	CCRL	Cattle Crown Rump Length	15mm to 180mm
SHEEP	STD	Sheep Trunk Diameter	15mm to 100mm
	SHD	Sheep Head Diameter	20mm to 65mm
DOG	DGSD	Dog Gestation Sac Diameter	1.0mm to 33.0mm
	DCRL	Dog Crown Rump Length	1.0mm to 43.0mm
	DHD	Dog Head Diameter	14.0mm to 30.0mm
	DBD	Dog Body Diameter	16.0mm to 51.4mm
CAT	cHD	Cat Head Diameter	15.0mm to 23.0mm
	cBD	Cat Body Diameter	17.0mm to 36.0mm



If the measured value is outside of the measurement range, ??? will be displayed for estimated fetal age (GA) and the predicted delivery date as determined by the measurement (ED).

Equine Gestational Age Table

ESD
(Equine Sac Diameter)

mm	days
6	7
7.3	8
8.8	9
11.3	10
12.5	11
13.7	12
14.9	13
16.5	14
17.7	15
19.5	16
20.7	17
22.5	18
23.7	19
25.3	20
27.1	21
28.4	22
30.2	23
32	24
33.8	25
36.2	26
37.4	27
39	28
40.3	29
42.3	30
43.6	31
45	32
47	33
47.7	34
49.3	35
51.1	36
52.8	37
54.6	38
56.2	39
57	40
58.4	41
59.8	42
60	42

ECD
(Equine Conceptus Diameter)

mm	days
14	14
15	14
16	14
17	15
18	15
19	15
20	16
21	16
22	17
23	17
24	18
25	18
26	19
27	20
28	21
29	22
30	23
31	24
32	25
33	26
34	27
35	28
36	29
37	30
38	31
39	32
40	32
41	33
42	33
43	34
44	34
45	35
46	35
47	36
48	36
49	36
50	37
51	37
52	37
53	38
54	38
55	38

mm	days
56	39
57	39
58	39
59	40
60	40
61	40
62	41
63	41
64	41
65	42
66	42
67	42
68	43
69	43
70	43
71	44
72	44
73	44
74	45
75	45

Cattle Gestational Age Table

CTD
(Cattle Trunk Diameter)

mm	days
15	54
16	57
17	59
18	61
19	63
20	65
21	67
22	69
23	70
24	72
25	73
26	75
27	76
28	78
29	79
30	80
31	81
32	82
33	84
34	85
35	86
36	87
37	88
38	89
39	90
40	91
41	92
42	93
43	93
44	94
45	95
46	96
47	97
48	98
49	98
50	99
51	100
52	101
53	101
54	102
55	103

mm	days
56	103
57	104
58	105
59	105
60	106
61	106
62	107
63	108
64	108
65	109
66	109
67	110
68	111
69	111
70	112
71	112
72	113
73	113
74	114
75	114
76	115
77	115
78	116
79	116
80	117
81	117
82	117
83	118
84	118
85	119
86	119
87	120
88	120
89	121
90	121
91	121
92	122
93	122
94	123
95	123
96	123

mm	days
97	124
98	124
99	125
100	125
101	125
102	126
103	126
104	126
105	127
106	127
107	127
108	128
109	128
110	128
111	129
112	129
113	129
114	130
115	130
116	130
117	131
118	131
119	131
120	132
121	132
122	132

Cattle Gestational Age Table

CHL
(Cattle Head Length)

mm	days
22	57
23	59
24	61
25	62
26	64
27	65
28	67
29	68
30	70
31	71
32	72
33	73
34	75
35	76
36	77
37	78
38	79
39	80
40	81
41	82
42	83
43	84
44	85
45	86
46	87
47	88
48	89
49	89
50	90
51	91
52	92
53	93
54	93
55	94
56	95
57	95
58	96
59	97
60	98
61	98
62	99
63	100

mm	days
64	100
65	101
66	101
67	102
68	103
69	103
70	104
71	104
72	105
73	105
74	106
75	107
76	107
77	108
78	108
79	109
80	109
81	110
82	110
83	111
84	111
85	112
86	112
87	113
88	113
89	113
90	114
91	114
92	115
93	115
94	116
95	116
96	117
97	117
98	117
99	118
100	118
101	119
102	119
103	119
104	120
105	120

mm	days
106	121
107	121
108	121
109	122
110	122
111	122
112	123
113	123
114	123
115	124
116	124
117	125
118	125
119	125
120	126
121	126
122	126
123	127
124	127
125	127
126	128
127	128
128	128
129	128
130	129
131	129
132	129
133	130
134	130
135	130
136	131
137	131
138	131
139	131
140	132
141	132
142	132
143	133
144	133
145	133

Cattle Gestational Age Table

CHD
(Cattle Head Diameter)

mm	days	mm	days
15	56	57	116
16	58	58	117
17	61	59	117
18	64	60	118
19	66	61	119
20	69	62	120
21	71	63	120
22	73	64	121
23	75	65	122
24	77	66	123
25	79	67	123
26	80	68	124
27	82	69	125
28	84	70	125
29	85	71	126
30	87	72	126
31	88	73	127
32	90	74	128
33	91	75	128
34	93	76	129
35	94	77	130
36	95	78	130
37	96	79	131
38	98	80	131
39	99	81	132
40	100	82	132
41	101	83	133
42	102	84	133
43	103	85	134
44	104		
45	105		
46	106		
47	107		
48	108		
49	109		
50	110		
51	111		
52	112		
53	113		
54	113		
55	114		
56	115		

Cattle Gestational Age Table

CCRL
(Cattle Crown Rump Length)

mm	days
15	34
16	35
17	36
18	37
19	38
20	39
21	39
22	40
23	41
24	42
25	42
26	43
27	44
28	44
29	45
30	45
31	46
32	46
33	47
34	47
35	48
36	48
37	49
38	49
39	50
40	50
41	51
42	51
43	51
44	52
45	52
46	53
47	53
48	53
49	54
50	54
51	54
52	55
53	55
54	55
55	56
56	56

mm	days
57	56
58	56
59	57
60	57
61	57
62	58
63	58
64	58
65	58
66	59
67	59
68	59
69	59
70	60
71	60
72	60
73	60
74	60
75	61
76	61
77	61
78	61
79	62
80	62
81	62
82	62
83	62
84	63
85	63
86	63
87	63
88	63
89	64
90	64
91	64
92	64
93	64
94	64
95	65
96	65
97	65
98	65

mm	days
99	65
100	66
101	66
102	66
103	66
104	66
105	66
106	66
107	67
108	67
109	67
110	67
111	67
112	67
113	68
114	68
115	68
116	68
117	68
118	68
119	68
120	69
121	69
122	69
123	69
124	69
125	69
126	69
127	70
128	70
129	70
130	70
131	70
132	70
133	70
134	70
135	71
136	71
137	71
138	71
139	71
140	71

mm	days
141	71
142	71
143	72
144	72
145	72
146	72
147	72
148	72
149	72
150	72
151	72
152	73
153	73
154	73
155	73
156	73
157	73
158	73
159	73
160	73
161	73
162	74
163	74
164	74
165	74
166	74
167	74
168	74
169	74
170	74
171	74
172	75
173	75
174	75
175	75
176	75
177	75
178	75
179	75
180	75

Sheep Gestational Age Table

STD

(Sheep Trunk Diameter)

mm	days
15	50
16	51
17	52
18	52
19	53
20	54
21	55
22	56
23	57
24	58
25	59
26	59
27	60
28	61
29	62
30	63
31	64
32	65
33	66
34	67
35	67
36	68
37	69
38	70
39	71
40	72
41	73
42	74
43	74
44	75
45	76
46	77
47	78
48	79
49	80
50	81
51	81
52	82
53	83
54	84
55	85
56	86
57	87

mm	days
58	88
59	89
60	89
61	90
62	91
63	92
64	93
65	94
66	95
67	96
68	96
69	97
70	98
71	99
72	100
73	101
74	102
75	103
76	103
77	104
78	105
79	106
80	107
81	108
82	109
83	110
84	111
85	111
86	112
87	113
88	114
89	115
90	116
91	117
92	118
93	118
94	119
95	120
96	121
97	122
98	123
99	124
100	125

SHD

(Sheep Head Diameter)

mm	days
20	49
21	50
22	52
23	54
24	55
25	57
26	58
27	60
28	62
29	63
30	65
31	66
32	68
33	69
34	71
35	73
36	74
37	76
38	77
39	79
40	81
41	82
42	84
43	85
44	87
45	88
46	90
47	92
48	93
49	95
50	96
51	98
52	99
53	101
54	103
55	104
56	106
57	107
58	109
59	111
60	112
61	114
62	115

mm	days
63	117
64	118
65	120

Gestational Age of Dogs: ± 3 days

GA: Gestational Age (the case under the 40 days)

$$GA_{(\text{days})} = (6 \times DGSD_{(\text{cm})}) + 20 \quad (\text{DGSD measuring limit: 0.1 to 3.3 cm})$$

$$GA_{(\text{days})} = (3 \times DCRL_{(\text{cm})}) + 27 \quad (\text{DCRL measuring limit: 0.1 to 4.3 cm})$$

GA : Gestational Age (the case over the 40 days)

$$GA_{(\text{days})} = (15 \times DHD_{(\text{cm})}) + 20 \quad (\text{DHD measuring limit: 1.4 to 3.0 cm})$$

$$GA_{(\text{days})} = (7 \times DBD_{(\text{cm})}) + 29 \quad (\text{DBD measuring limit: 1.6 to 5.14 cm})$$

$$DBP_{(\text{days})} = 65 - GA_{(\text{days})}$$

(DBP: Days Before Parturition in the Dog)

A. Gestational Age of Cats: ± 2 days

GA : Gestational Age (the case over the 40 days)

$$GA_{(\text{days})} = (25 \times cHD_{(\text{cm})}) + 3 \quad (\text{cHD measuring limit: 1.5 to 2.3 cm})$$

$$GA_{(\text{days})} = (11 \times cBD_{(\text{cm})}) + 21 \quad (\text{cBD measuring limit: 1.7 to 3.6 cm})$$

$$DBP_{(\text{days})} = 61 - GA_{(\text{days})}$$

(DBP: Days Before Parturition in the Cat)

The initial settings for the function keys have estimated fetal age measurements assigned to them. These will appear at the bottom of the regular screen.

Key	Screen Display	Function	
F1	DBD	Dog Body Diameter	Estimated fetal age measurement
F2	cBD	Cat Body Diameter	Estimated fetal age measurement
F3	DHD	Dog Head Diameter	Estimated fetal age measurement
F4	cHD	Cat Head Diameter	Estimated fetal age measurement
F5	CHD	Cattle Head Diameter	Estimated fetal age measurement
F6	CHL	Cattle Head Length	Estimated fetal age measurement
F7	CTD	Cattle Trunk Diameter	Estimated fetal age measurement
F8	DGSD	Dog Gestation Sac Diameter	Estimated fetal age measurement
F9	ECD	Equine Conceptus Diameter	Estimated fetal age measurement

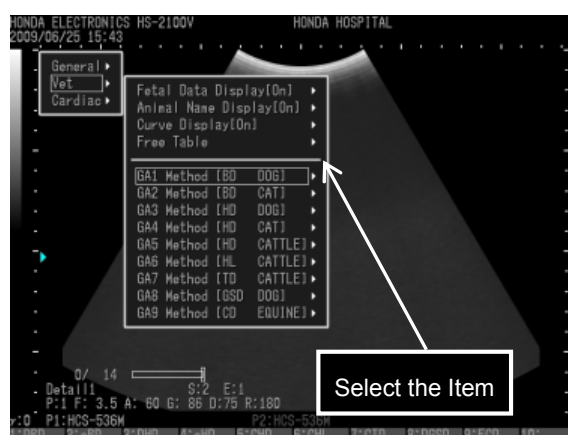
4.2 ASSIGNMENT OF FETAL AGE TABLE

This item describes how to assign the fetal age table.

1. Press the  key for one second and the measurement setting menu will appear.

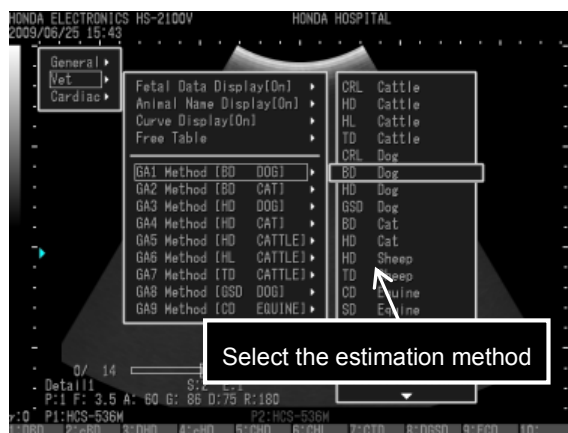
2. Use **SELECT** () to select **Vet.** Press **SELECT** (ON) to execute. (Press the  key to move to the next higher menu item.)

3. Use **SELECT** () to select the item to be changed (GA1 Method to GA9 Method) and press **SELECT** (ON).



4. Use **SELECT** () to select the estimation method and press **SELECT** (ON). The fetal age table will be changed.

5. Press the  key to close the menu.



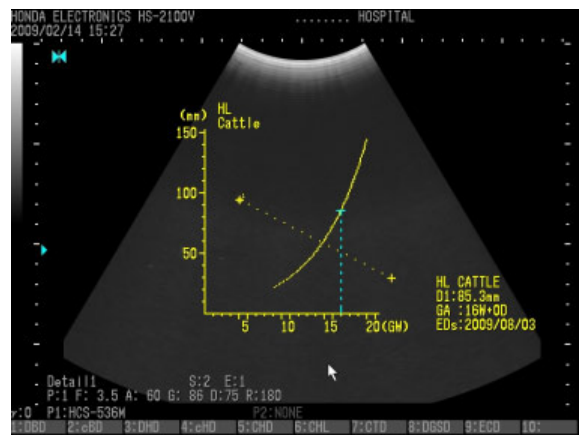
If an assignment to a key is not necessary, please select "None."

4.3 ESTIMATING GESTATIONAL AGE

This item describes how to make gestational age measurements following the example for the cattle head length (CHL) program in the fetal age diagnosis program. The fetal age tables in GA1 through GA9 that were saved in 4.2 can be called up directly by using the F1 through F9 keys.

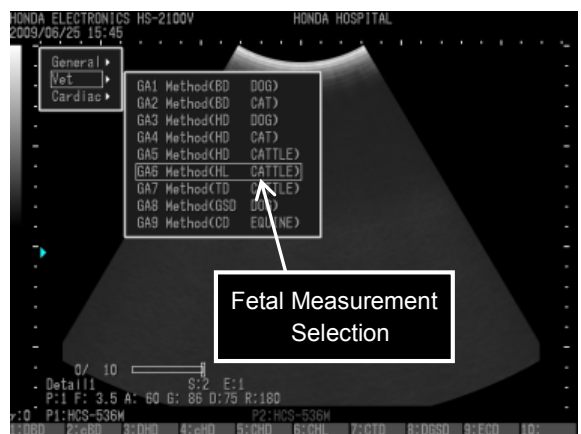
1. After freezing the image, press the F6 key as the Cattle Head Length (CHL) has been saved in the initial settings for F6.
2. Use the track ball to move the cursor to the start of the measurement and press the **SET** key. The measurement start position has been selected.
3. Use the track ball to move the cursor to the end of the measurement and press the **SET** key. The fetal age table graph will be displayed in the middle of the screen. The measured values, estimated fetal age and predicted date of birth are shown.

HL CATTLE ←Title
D1 : 85.3mm ←Measured value
GA : 16W+0D ←Estimated age of fetus
EDs : 2009/08/03 ←Predicted date of birth based on measured values.



It is also possible to call this up directly from the measurement menu.

1. Press the **CALC. MENU** key and the measurement menu screen will appear.
2. Use **SELECT** (↶) and **SELECT** (ON) to select **Vet** **GA6 Method (HL CATTLE)**. Press **SELECT** (ON) to execute. (Press the **ESC** key to move to the next higher menu item.) The measurement of Cattle Head Length (CHL) will start.



Use the above as a reference when making other fetal age measurements.

4.4 DISPLAYING/HIDING FETAL AGE CURVE

This section describes displaying/hiding the curve for the fetal age table.

1. Press the  key for one second and the measurement setting menu will appear.
2. Use **SELECT** () and **SELECT** (ON) to select **Vet Curve Display**. Press **SELECT** (ON) to execute. (Press the  key to move to the next higher menu item.)
3. To display the fetal age curve, select **On**.
To hide the curve, select **Off**. Then press **SELECT** (ON).



4.5 DISPLAYING/HIDING THE MEASUREMENT HISTORY

This section describes the method for displaying/hiding of the measurement history.

1. Press the  key for one second and the measurement setting menu will appear.
2. Use **SELECT** (↶) and **SELECT** (ON) to select **Vet Fetal Data Display**. Press **SELECT** (ON) to execute. (Press the  key to move to the next higher menu item.)
3. To display the measurement history, select **On**.
To hide the measurement history, select **Off**.
Then press **SELECT** (ON).



4.6 DISPLAYING/HIDING THE NAMES OF ANIMALS

This section describes the method for displaying/hiding of the names of the animals displayed in the measurement history.

1. Press the  key for one second and the measurement setting menu will appear.
2. Use **SELECT** (↶) and **SELECT** (ON) to select **Vet** **Animal Name Display**. Press **SELECT** (ON) to execute. (Press the  key to move to the next higher menu item.)
3. To display the animal names, select **On**. To hide the animal names, select **Off**. Then press **SELECT** (ON).



If **Off** is selected for hiding/displaying the measurement history, the animal names will not be displayed regardless of the animal name display/hide setting.

4.7 USER TABLE

User can define own table as “User Table” for the special need for obstetric diagnose.

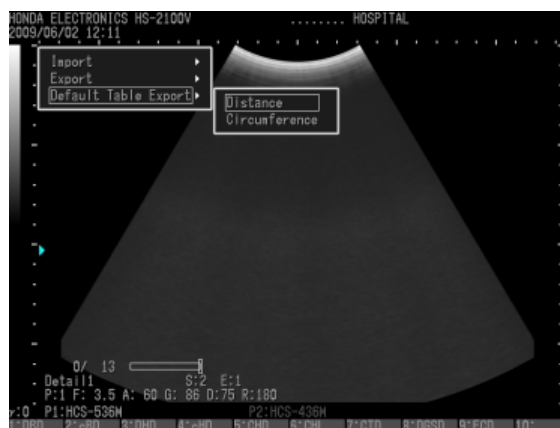
The basic procedure to define user table is,

- 1) Create a table template Downloading default template to USB memory.
- 2) Preparation before edit table Necessary note before editing the default table
- 3) Edit user table Actual editing of the table
- 4) Upload user table Upload own table data to HS-2100V
- 5) Download user table Download the uploaded table data from HS-2100V*

* 5) Download user table is used to back up the table data or correction.

4.7.1 Create a Table Template

1. Insert USB memory to the USB memory port and press and hold the  key.
Measurement Setting menu screen will appear.
2. Use **SELECT** () and **SELECT** (ON) to select **Obstetric** **Free Table** **Default Table Export**.
Press **SELECT** (ON) to execute. (Press the  key to return the higher menu item.)
3. Use **SELECT** () to select **Distance** or **Circumference**, then press **SELECT** (ON) to execute.



4. Template file (CSV format) is created in the USB memory. “Completed” message will be shown when it is done.



It is not possible to create a template file without USB memory inserted to HS-2100V.



Template file will be created in folders (comma and semicolon) in USB memory like below

```
freetable_Timport
└─export_Tcomma( “,” as a separator)
    └─semicolon( “;” as a separator)
```



Template for distance will be created as “freetable_distance.csv” and for circumference as “freetable_circumference.csv”.

4.7.2 Preparation before Edit Table

Please use spread sheet program such as EXCEL installed computer. The edit work will be done on such computer. (Editing table function is not included in HS-2100V)

1. Open the template file created in USB memory*.

*Please try any file from comma or semicolon folder at this time.

2. If you see the sheet like below, the format is correctly recognized by the software.

Refer to “4.7.3 Edit User Table”.

	A	B	C	D
1	#Type of measurement : Distance			
2				
3	#Name of method			
4	Name	Free Table Name		
5				
6	#Period of gestation (days)			
7	Period			
8				
9	#Length (mm)	W (weeks)	D (days)	+/- (days)
10	1	0	0	0
11	2	0	0	0
12	3	0	0	0
13	4	0	0	0
14	5	0	0	0

If you see the table like below, please reopen the file from semicolon folder.

	A	B	C	D
1	#Type of measurement : Distance;;			
2				
3	#Name of method;;			
4	Name;Free Table Name;;			
5				
6	#Period of gestation (days);;			
7	Period;;			
8				
9	#Length (mm);W (weeks);D (days);+/- (days)			
10	1;0;0;0			
11	2;0;0;0			
12	3;0;0;0			
13	4;0;0;0			
14	5;0;0;0			

If you see the table like below, please reopen the file from comma folder.

	A	B	C	D
1	#Type of measurement : Distance;;			
2				
3	#Name of method;;			
4	Name;Free Table Name;;			
5				
6	#Period of gestation (days);;			
7	Period;;			
8				
9	#Length (mm);W (weeks);D (days);+/- (days)			
10	1;0;0;0			
11	2;0;0;0			
12	3;0;0;0			
13	4;0;0;0			
14	5;0;0;0			



Separator for CSV file depends on the setting of “Regional and Language Options” in the “Control Panel” of Windows.

4.7.3 Edit User Table

This section describes how to edit the user table.

1. Open a table file (if it is the first time, open a template file. Refer to 4.7.1 and 4.7.2).
2. Please input necessary data like following.

	A	B	C	D
1	#Type of measurement : Distance			
2				
3	#Name of method			
4	Name	Free Table Name		
5				
6	#Period of gestation (days)			
7	Period			
8				
9	#Length (mm)	W (weeks)	D (days)	+/- (days)
10	1	0	0	0
11	2	0	0	0
12	3	0	0	0
13	4	0	0	0
14	5	0	0	0

Name of the table ("Free Table Name"
as default)

Pregnancy period (days) (500 Maximum.
Normally 270 days for human)

Input Length(mm), weeks and days

W(weeks): Week value (center value) for selected Length(mm) ((Period/7)-1 is the max)

D(days): Day value (center value) for selected Length(mm) (0~6)

+/- (days): Deviation value (days) to the center value(99 is the max. choose 0, if unnecessary)

ex.) For 30mm as 100 days $\pm$ 3 days,

#Length (mm)	W (weeks)	D (days)	+/- (days)
30	14	2	3

(100days $\rightarrow$ 14weeks+2days)



All input must be alphanumeric letters



Numeric values must be positive value.

3. Please save file with the name following below rule.

ex.) template : freetable_distance.csv



actual : freetable1distance.csv

*Choose 1, 2 or 3 for distance and 4, 5 or 6 for circumference measurement.



Folder location
freetableTimport (save edited file here for upload)
Lexport

4.7.4 Upload User Table

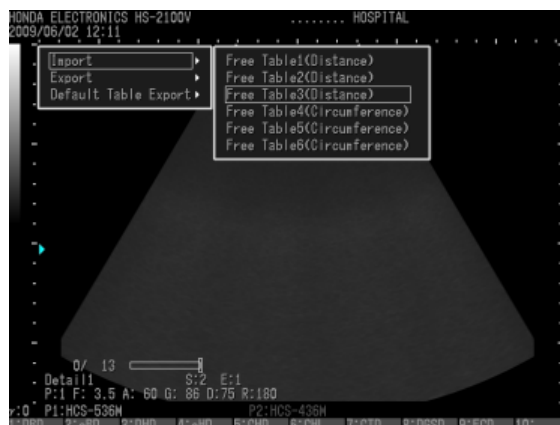
This describes how to upload the user table to HS-2100V from USB memory.

1. Insert USB memory to the USB memory

port and press and hold the  key.

Measurement Setting menu screen will appear.

2. Use **SELECT** () and **SELECT** (ON) to select **Obstetric** **Free Table** **import**. Press **SELECT** (ON) to execute. (Press the  key to return the higher menu item.)



3. Use **SELECT** () to select the table to upload, and then press **SELECT** (ON) to execute.
4. The selected file in the USB memory will be uploaded to HS-2100V. "Completed" message will be shown when it is done.



In the case of upload process failed, "Import Error" message will be shown on the screen.
The log file will be created to the same folder as uploading file.
Please read the log file and correct the error of the table and try upload again.



After user table upload is completed, it can be assigned to function keys. Please refer to 4.1.1 Assignment of Fetal Age Tables.
Assignment of User table is necessary to use User table estimation.
*The maximum number of Fetal Age Calculation (4.2) is 9. Please assign the necessary User table in one of GA1 to GA9.



When the User table is modified, the store data with the original User table measurement will be erased. Please measure it again, if necessary.

4.7.5 Download User Table

This describes how to download the user table from HS-2100V to USB memory.

1. Insert USB memory to the USB memory

port and press and hold the  key.

Measurement Setting menu screen will appear.

2. Use **SELECT**() and **SELECT**(ON) to select **Obstetric** **Free Table** **export**. Press **SELECT**(ON) to execute. (Press the  key to return the higher menu item.)



3. Use **SELECT**() to select the table to download, and then press **SELECT**(ON) to execute.
4. The selected file in the USB memory will be downloaded from HS-2100V. "Completed" message will be shown when it is done.



It is not possible to download a user table file without USB memory inserted to HS-2100.



Folder location

freetableTimport

└export (downloaded file is saved in this folder)

CHAPTER 5 DATA MANAGEMENT

This chapter describes the various ways to arrange the data such as entering ID data or saving image data.

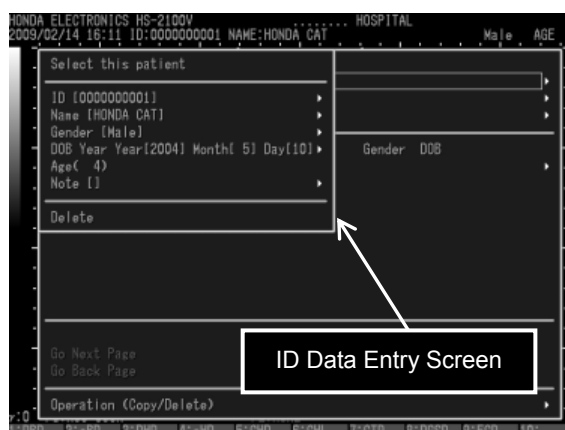
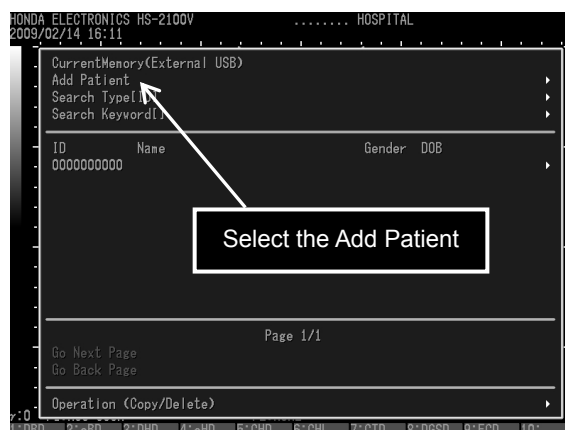
5.1 ID DATA

This chapter describes the various ways to arrange ID data.

5.1.1 Saving the ID Data

This item describes how to save the ID data.

1. Press the **NEW PATIENT** key for one second.
2. Press **SELECT** (ON) at **Add Patient** and the ID data entry screen will be displayed.
3. Use **SELECT** (↶) and **SELECT** (ON) to select the necessary item.
4. For the **ID**, **Name** and **Note** use the character input keys to make the entry and press the **FIX** key to set.
5. If selecting **Gender**, use **SELECT** (↶) and **SELECT** (ON) to make the setting. Available settings are **Male**, **Female** and **None** (no designation).
6. To enter the date of birth (DOB), use **SELECT** (↶) and **SELECT** (ON) to select the numbers in the sequence of year, month day.



7. After entering the necessary item, select **Select this Patient** and press **SELECT** (ON).

The saved ID is selected and the display returns to the normal screen.



Press the **NEW PATIENT** key for one second to cancel Freeze and the measured data and annotations will be deleted. If necessary, save the data before pressing the **NEW PATIENT** key.



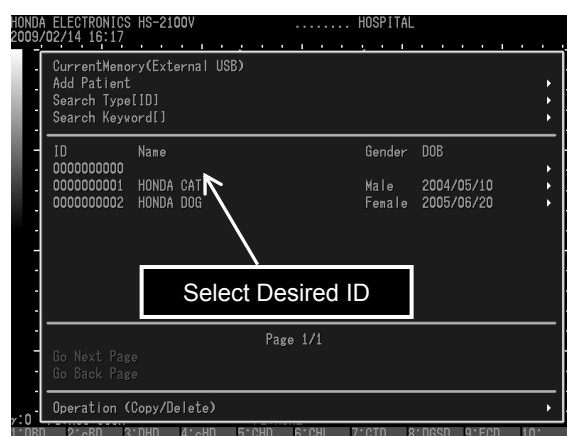
An ID must be entered when saving an ID

-  Press  without pressing **Select this Patient** and only the ID will be saved.
-  Press  without pressing **Select this Patient**, a default ID will be selected after the ID has been saved and the display will return to the normal screen.
-  The ID data that has been saved in the destination that has been saved. (Refer to "1.6.6 Setting the Save Destination".)

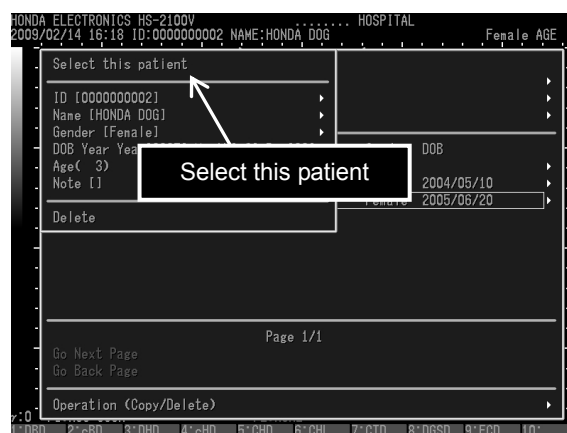
5.1.2 Selecting the ID Data

This item describes how to select the ID data.

1. Press the  key for one second.
2. Use **SELECT** () to select the ID and press **SELECT** (ON).
3. Press **SELECT** (ON) for **Select this Patient** and the ID will be selected.



-  If an ID is not selected, the default ID of 0000000000 will be used.



-  Activating Patient Menu by pressing the  key for one second, it will Unfreeze the image and the measured data and annotations will be deleted. If necessary, save the data before pressing the  key.

-  If the menu closed by ,  or  key without selecting the ID, the default ID will be selected.

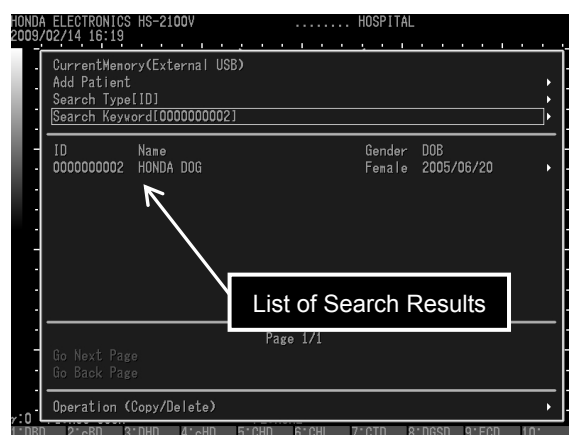
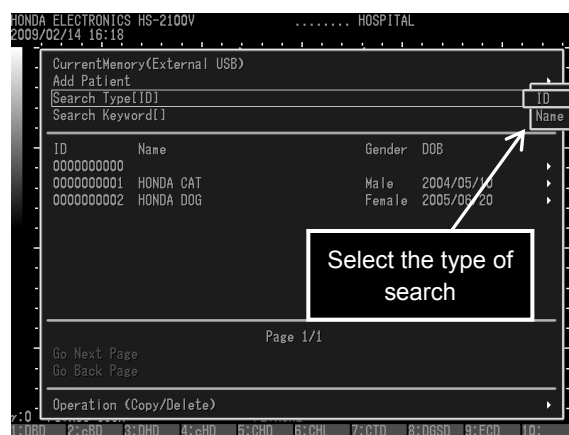
-  Turn off the power and the default ID will be restored.



5.1.3 Searching the ID Data

This item describes how to search the ID data.

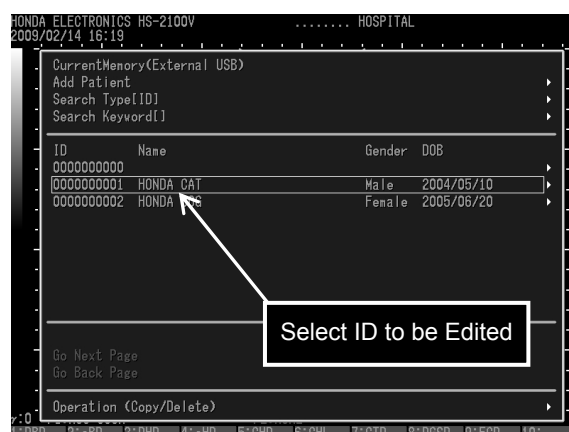
1. Press the **NEW PATIENT** key for one second.
2. Use **SELECT** (↶) to select **Search Type**.
Press **SELECT** (ON) to execute.
3. Use **SELECT** (↶) to select a search by either **ID** or **Name** and press **SELECT** (ON).
4. Use **SELECT** (↶) to select **Search Keyword**.
Press **SELECT** (ON) to execute.
5. Use the character entry key to enter the characters to be searched for and press the **FIX** key to confirm the characters.
A list of the search results will be displayed.



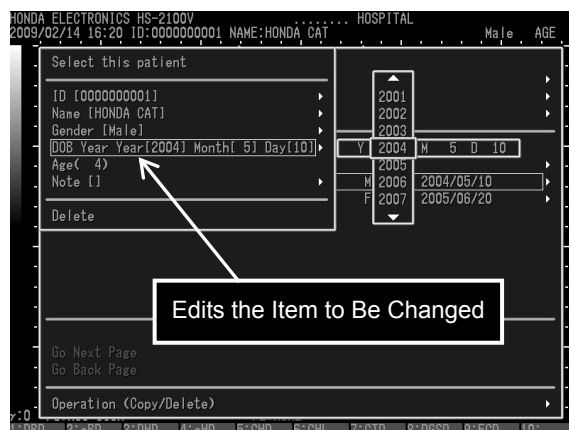
5.1.4 Editing the ID Data

This item describes how to edit the ID data.

1. Press the **NEW PATIENT** key for one second.
2. Use **SELECT** (↶) to select the ID to be edited and press **SELECT** (ON).
3. Use **SELECT** (↶) and **SELECT** (ON) to select item to be changed.
4. For the **ID**, **Name** and **Note** use the character input keys to make the entry and press the **FIX** key to set.



5. If selecting **Gender**, use **SELECT**(↶) and **SELECT**(ON) to make the setting. Available settings are **Male**, **Female** and **None** (no designation).
6. To enter the date of birth (DOB), use **SELECT**(↶) and **SELECT**(ON) to select the numbers in the sequence of year, month day.



7. After changing the necessary item, select **Select this Patient** and press **SELECT**(ON). The edited ID is selected and the display returns to the normal screen.



Press **ESC** without pressing **Select this Patient** and only the editing of the ID will be saved.

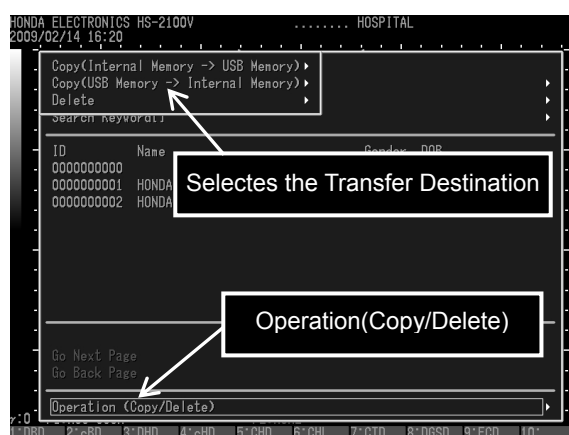


Press **MENU** without pressing **Select this Patient**, a default ID will be selected after the ID has been edited and the display will return to the normal screen.

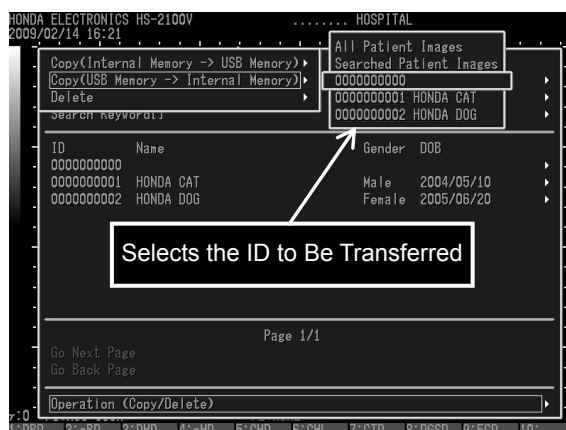
5.1.5 Transferring the ID Data

This item describes how to transfer (copy) the ID data.

1. Press the **NEW PATIENT** key for one second.
2. Use **SELECT**(↶) to select **Operation(Copy/Delete)**. Press **SELECT**(ON) to execute.
3. Use **SELECT**(↶) to make one of the following selections:
Copy(Internal Memory -> USB Memory) or
Copy(USB Memory -> Internal Memory)
 and press **SELECT**(ON).



- Make one of the following selections: to transfer all ID entries, select **All Patient Images**; to transfer the results of a search, press **Searched Patient Images**; to transfer the entries for an individual ID, select the individual ID. After making the selection, press **SELECT (ON)**.



No transfer will be made if there is no USB memory device connected.

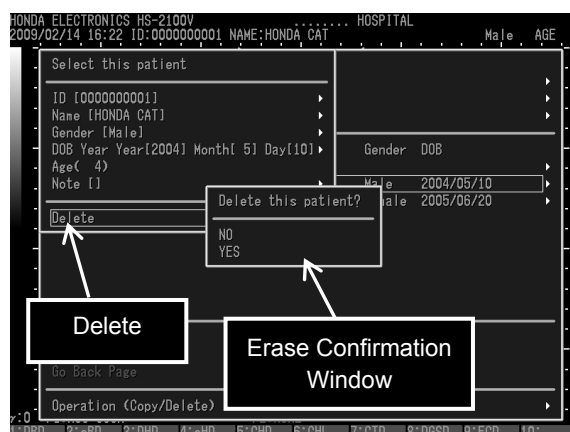


Never remove the USB memory device during transfer.

5.1.6 Deleting the ID Data

This item describes how to delete the ID data.

- Press the **NEW PATIENT** key for one second.
- Use **SELECT (↵)** to select the ID to be deleted and press **SELECT (ON)**.
- Use **SELECT (↵)** to select **Delete** and press **SELECT (ON)**. The “Delete this Patient?” confirmation prompt screen will appear. Select **YES**.



To delete all ID entries or all the results of a search, press the **NEW PATIENT** key for one second and conduct a search, etc. (Refer to “5.1.3 Searching the ID Data”.) Select **Operation (Copy/Delete)** **Delete** to delete all.

5.2 IMAGE DATA

This section describes the various ways to arrange image data.

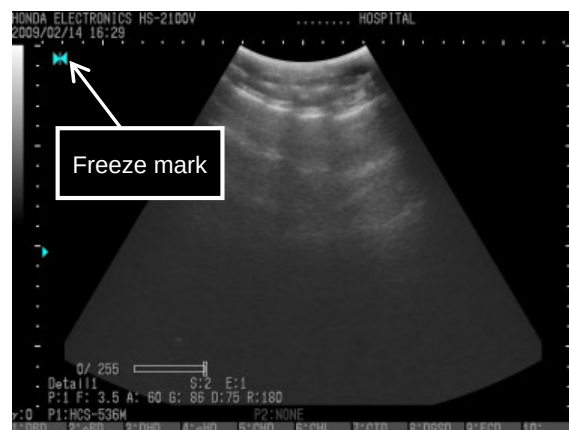


Remove the USB memory device when it is not in use.

5.2.1 Saving Image Data

This item describes how to save image data.

1. Press the  key to freeze the image.
2. Press the  key. The image will be saved.



If the save destination is a USB memory device, ID folders are created inside the patient folder in the USB memory device. The image data is saved in the selected ID folder.



If the save destination is the internal memory, the data cannot be saved if there is insufficient space. When resaving an image, the images in the internal memory must be deleted. If there is insufficient space, transfer any needed images to a USB memory device and delete the images in the internal memory to create more available space.

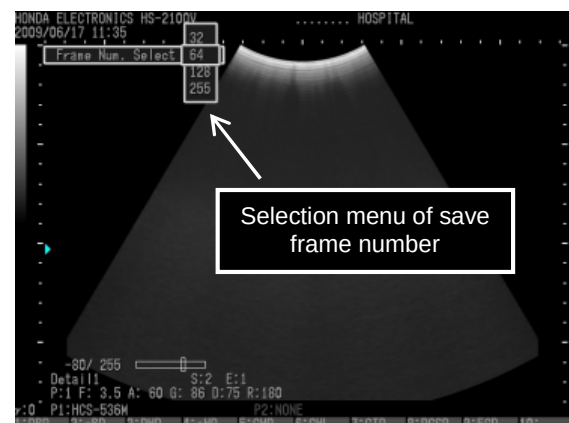
5.2.2 Saving Moving Image Data

This item describes how to save moving image (AVI) data.

1. Set the destination to External USB and connect an external USB memory device.
(Refer to "1.6.6 Setting Save Destination".)

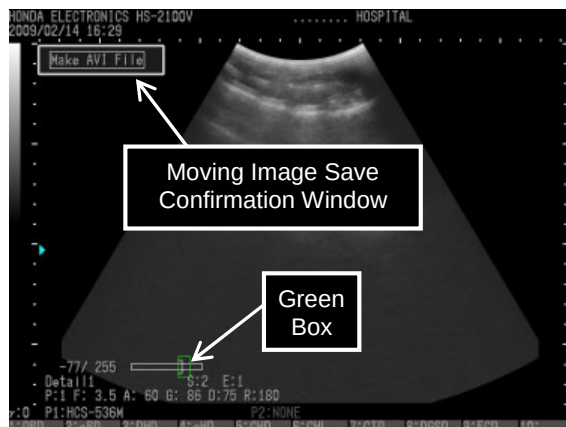
2. Press the  key.
3. Turn **RANGE** () to move to the start position of the moving image to be saved.

4. Press the  key for one second.
5. The selection menu for the save frame number



will be displayed. Turn **SELECT** (↶) to select the necessary number and then press **SELECT** (ON).

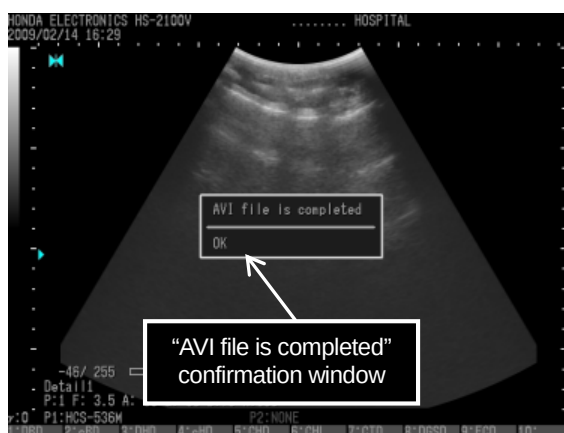
6. The "Make AVI File?" confirmation window will be displayed. At this time the frames of the moving image to be saved will appear in the green box. If necessary, turn **RANGE** (↶) to select the images.



If you wish to change the start position of the data to be saved, press the **ESC** key and then set the start position once again.

7. Press **SELECT** (ON) and the saving of the moving images will begin.

8. Once the saving has been completed, the green box will disappear and a "AVI file is completed" confirmation window will be displayed.



Never remove the USB memory device while the data is being saved (when the green box is displayed).

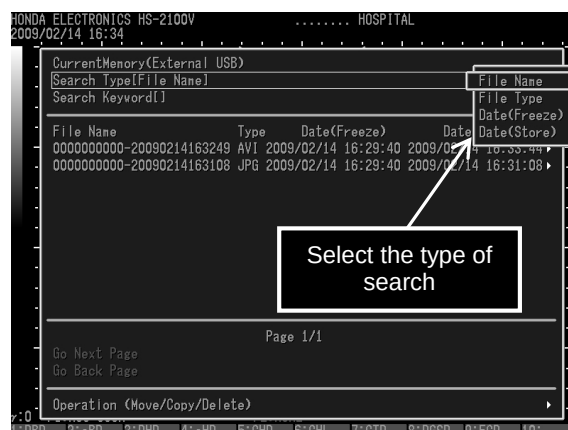


The moving images will be saved in AVI format. Saved moving images cannot be replayed on this device.

5.2.3 Searching for Image Data

This item describes how to search the image data.

1. Press the **IMAGE UTILITY** key.
2. Use **SELECT** (↶) to select **Search Type**. Press **SELECT** (ON) to execute.



3. Use **SELECT** (↶) and select from among the following: **File Name**, **File Type**, **Date(Freeze)**, **Date(Store)**. Press **SELECT** (ON).
4. Use **SELECT** (↶) to select **Search Keyword**. Press **SELECT** (ON) to execute.
5. If the search is by **File Name**, enter the characters. If the search is by **File Type**, select either **JPG** or **AVI**. If the search is for **Date (Freeze)** or **Date (Store)**, select the desired day and time. Execute the search.
A list of the search results will be displayed.



Searching will only be done for the ID that is selected.

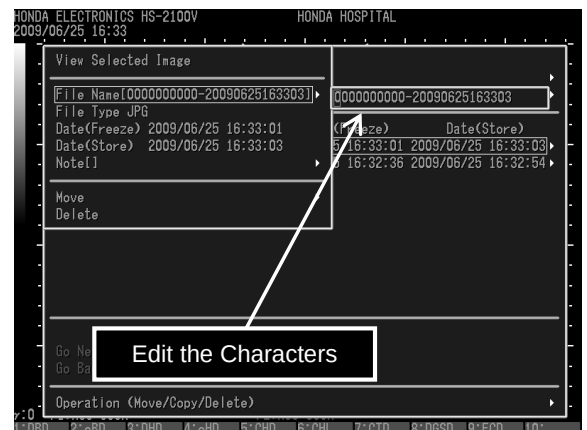


If **Date (Freeze/Store)** was selected in **Search Type**, select only the necessary section and leave the other areas as ??.
(Example: [2009/??/?? ??:?:?])

5.2.4 Editing Image Data

This item describes how to edit the image data.

1. Press the key.
2. Use **SELECT** (↶) to select the image to be edited and press **SELECT** (ON).
3. Use **SELECT** (↶) to select **File Name** or **Note** and press **SELECT** (ON).
4. Edit the characters and then press the key to set.

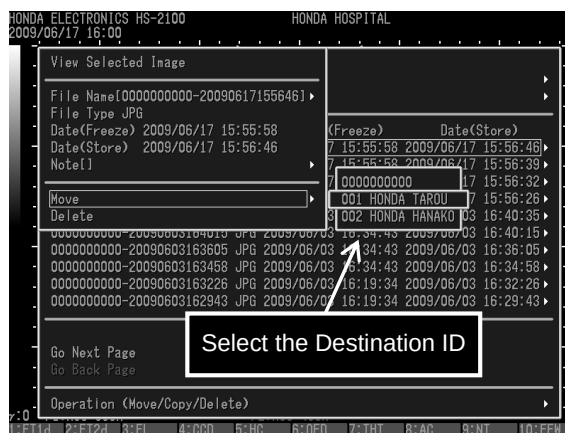


This will only be for the ID that is selected.

5.2.5 Moving Image Data

This item describes how to move the image data.

1. Press the  key.
2. Use **SELECT** () to select the image to be moved and press **SELECT** (ON).
3. Use **SELECT** () to select **Move**. Press **SELECT** (ON) to execute.
4. Use **SELECT** () to select the ID to be moved and press **SELECT** (ON).



Moving will only be done for the ID of the image that is selected.



To move all the images, press the  key, and select **Operation(Move/Copy/Delete)**-**Move All** to move the images.

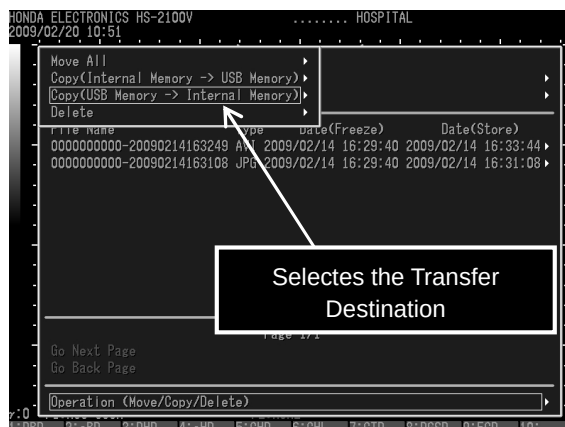


Moving image data can only be done within the memory that has been designated as the save destination. (Moving between IDs.)

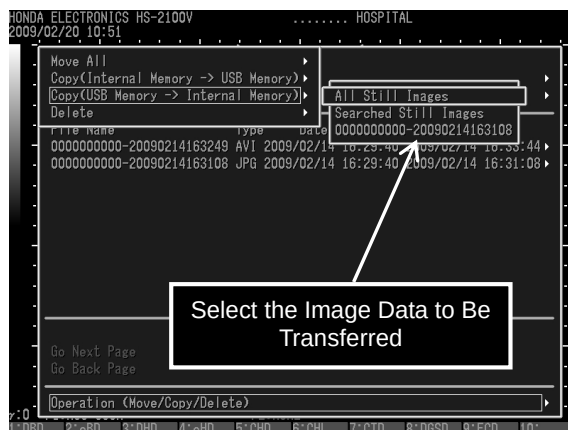
5.2.6 Transferring Image Data

This item describes how to transfer (copy) the image data.

1. Press the  key.
2. Use **SELECT** () to select **Operation(Move/Copy/Delete)**. Press **SELECT** (ON) to execute.
3. Use **SELECT** () to make one of the following selections: **Copy(Internal Memory -> USB Memory)** or **Copy(USB Memory -> Internal Memory)** and press **SELECT** (ON).



4. Use **SELECT** (↩) make the following selection: to transfer all images, select **All Still Images**; to transfer images that are the result of a search, select **Search Still Images**; to transfer an individual image, select the file name. Press **SELECT** (ON) to execute.

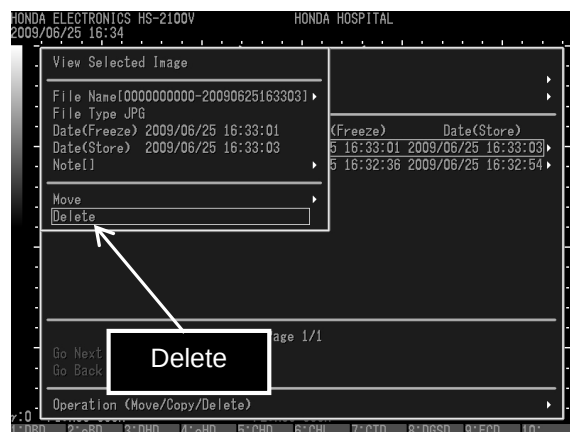


-  Transfer will only be done for the ID of the image that is selected.
-  No transfer will be made if there is no USB memory device connected.
-  The transfer (copy) of image data can only be performed between the internal memory and the USB memory device. (Copy between memory devices.)
-  Never remove the USB memory device during transfer.

5.2.7 Deleting Image Data

This item describes how to delete the image data.

1. Press the  key.
2. Use **SELECT** (↩) to select the image to be deleted and press **SELECT** (ON).
3. Use **SELECT** (↩) to select **Delete** and press **SELECT** (ON).



-  It is not possible to delete an image other than the ID selected.

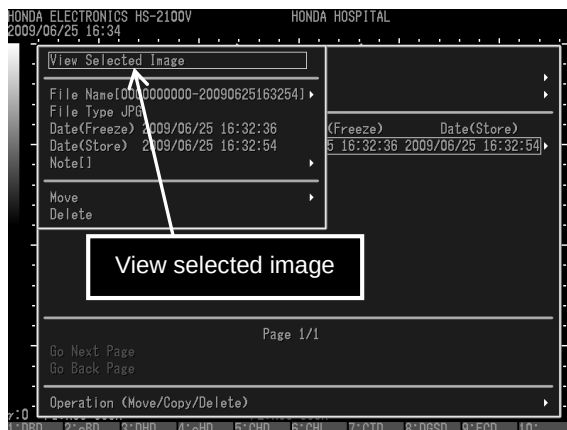


To delete all images or those from the result of a search, press the  key, perform the search (Refer to “5.2.3. Searching Image Data”) and select **Operation(Move/Copy/Delete)**-**Delete** to delete the images.

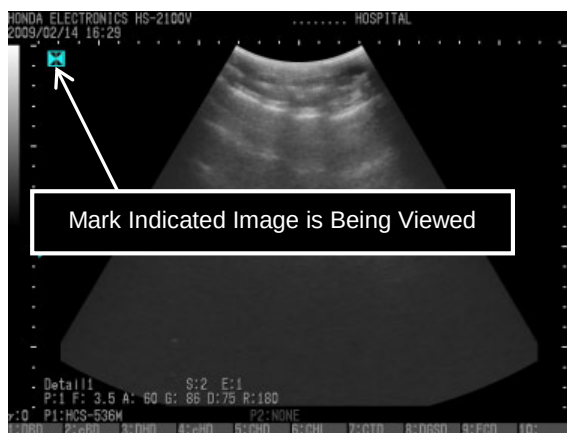
5.2.8 Viewing Image Data

This item describes how to view the image data.

1. Press the  key.
2. Use **SELECT** (↶) to select the image to be viewed and press **SELECT** (ON).
3. Press **SELECT** (ON) for **View selected image** and the selected image will be displayed.



4. Press the  key after the viewing has been completed to return to the menu screen. Press the  key once again to close the menu.



It is possible to select from the IDs of the images that are selected.



A light blue color frame on the Freeze mark indicates that the image is being viewed.



It is possible to perform measurements on images being viewed.



Press the  key during viewing and the image can also be saved (re-saved). (If the image is re-saved, the Freeze mark will change from light blue to blue.)

CHAPTER 6 APPENDIX

This chapter describes the troubleshooting for when HS-2100V does not work properly, cleaning methods for main body, probe, and specifications of HS-2100V.

6.1 TROUBLESHOOTING

This section describes the troubleshooting when HS-2100V does not work properly. Inspect HS-2100V according to the following “Condition” and “Countermeasure”. If the same trouble occurs repeatedly or the trouble not described below occurs, immediately contact our service section or distributor.

Condition	Check Point	Countermeasure
Screen does not display anything even if power switch is turned ON.	Check that power cable is connected properly.	Connect power cable properly.
The screen is displayed, but it is too dark.	Select Menu → Monitor and check the brightness level setting.	Select Menu → Monitor and set the brightness level.
The day and time appear on the screen, but the ultrasound image does not appear.	Check that probe cable is connected properly. Also, check that lock lever of probe is positioned at “LOCK”.	If probe is connected improperly, connect probe properly. If lock lever is positioned at “OPEN”, turn lock lever to “LOCK” position securely.
Even though the probe cable is properly attached and the day and time appear on the screen but no ultrasound image appears.	Check if the STC volume is properly set. Check if the gain is properly set.	Set the STC volume to the proper level. Also, set the gain to the proper level.
Video printer do not output ultrasound images.	Check that video cable and remote cable are connected properly. Also, check that power switches of video printer are turned ON.	If video and video printer are connected improperly, connect video and video printer properly. If power switches of video printer are not turned, turn ON.



Do not remove the cover of HS-2100V or perform the operation not described above.
Failure to do so could cause electrical shock due to high pressure or personal injury.

6.2 CLEANING



Be sure to turn OFF the power switch. Failure to do so could cause electrical shock.

1. Cleaning the Main Body

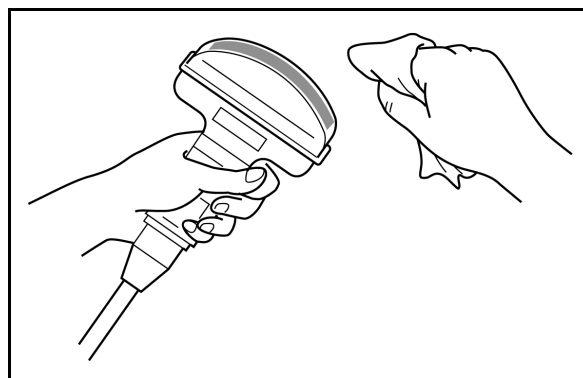
Remove dust inside outer main body with dry cloth. Clean using the cloth dampened with diluted neutral detergent.



Be careful not to dampen any liquid inside this equipment. If any liquid is dampened inside this equipment, it could cause failure.

2. Cleaning of Probe

After examination, clean the probe using soft damp cloth. Also, clean the contact surface of the probe using rubbing alcohol. Do not use except rubbing alcohol.



Handle the probe with sufficient care since the fragile ceramic crystal is adopted for the probe. Failure to do so could cause damage of the probe.

- Do not sterilize in autoclave. Failure to do so could cause damage of the probe
- Never soak the overall probe in solution.

6.3 IMPORTANT INFORMATION FOR USE AND MANAGEMENT

This section describes the specifications, conditions of use, etc. of HS-2100V.

1. Operation/Storage Conditions

1) Operating Conditions

Temperature	10°C to 40°C
Humidity	35% to 75%RH
Pressure	700hPa to 1060hPa
Power	100 to 240V 50/60Hz
Protective Earth	The protective earth in the power cable is grounded by inserting the three-core cable plug of HS-2100V into the medical-purpose three-core receptacle.

1) Shipping / Storage Conditions

Temperature	- 10°C to 60°C
Humidity	30% to 95%RH
Pressure	700hPa to 1060hPa

2) Precautions for Storage

- This equipment should be stored in a place that is not exposed to water or medicine.
- This equipment should be stored in a place that does not adversely affect the equipment such as exposure to the direct sunlight, high temperature, high humidity, and atmosphere including dust, salinity, sulphur, etc.
- It is important to be aware of inclination, vibration, or shock (including during transportation), etc. and make sure this equipment is stable.
- The equipment should not be stored in a place that chemicals are stored, or that exposed to the gas.
- When using this equipment again after long period, make sure to confirm that the equipment operates properly.

2. Precautions for Scrapping Packing Material

- The packing material and cushioning should not be wasted but should be stored, because they are necessary when moving or transporting this equipment.
- The cushioning, etc. should be stored together when storing the packing material
- If the packing and impact-reducing materials or the product itself and any of its accessories are to be disposed of, give environmental protection a high priority, separate the materials and dispose of in careful observation of national or regional laws and conditions. Please contact you sales representative if you have any questions.

3. Information Regarding Electro-magnetic Interference

- This equipment should not be used in the strong electrical field, or the strong magnetic field (around the transformer) to avoid adversely affecting the equipment.
- This equipment should not be used around the device generating high frequency (medical telemeter, cordless telephone, etc.) Failure to do so could cause the malfunction of this equipment, or cause other device to fail.

4. Escape Clause

- Perform diagnosis under the responsibility of the doctor. We, HONDA ELECTRONICS CO., LTD. assume no responsibility for diagnostic condition and diagnostic result.
- We assume no responsibility for the secondary damage such as wrong diagnosis caused by the formula of measuring equipment entered by the user.
- We assume no responsibility for quality or any loss relating to the product caused by the relocation, modification, inspection and repair performed by someone other than our service engineer or the specified service engineer.
- We assume no responsibility for any damage caused by ignoring the precautions and operation procedure specified in this manual.
- We do not guarantee the remaining data of this equipment when it is returned for repair, etc. It is recommended to take backups as much as possible.

5. Retention Period of Repair Part

- It is the policy of this company to retain repair parts for a model for seven (7) years after it has stopped being produced.

6.4 LABELING SYMBOLS

The following symbols are used on the product.

symbol	definition	description
	“ON” (power)	When it pressed, power turns ON.
	“OFF” (power)	When it pressed, power turns OFF.
 Remote	Remote control	It indicates connector for the remote cable of the printer.
	Output	It indicates connector for the video printer.
 Analog RGB	Television monitor	It indicates connector for the cable for the monitor of an external connection.
	Foot switch	It indicates connector for the foot switch.
	USB	It indicates connector for USB memory devices.
	Alternating current	It indicates connector for the power cable.
	Frame or chassis	It indicates grounding for the frame or the chassis.

6.5 PROTECTIVE INSPECTIONS

Protective inspections are required to maintain the performance and safe operation of the unit. The customer must responsibly perform protective inspections. There are both daily inspections and periodic inspections. Some of the periodic inspections require special tools and should only be performed by specially trained personnel. (For a fee, our company will perform those protective inspections requiring by specially trained personnel. We recommend that periodic protective inspections be performed annually to maintain the performance and safe operation of the unit. Please consult your sales representative for details.

- If the inspection should result in the abnormal operation of the unit, stop its use immediately and contact your sales representative.
- Always use extreme caution if you are going to perform the protective inspections yourself.
- We will not be responsible in any way for damage caused by service engineers not authorized by us.

1. Daily inspections

You are responsible for performing the daily inspections. Always perform these daily inspections before turning on the power.

Inspect the cables and probes for abnormalities.

Make sure the cables and probes are properly connected to the main unit.

- Always unplug the power supply before inspecting. This will prevent electrical shock in the rare event the unit is malfunctioning.
- If the probe is used with cracks, peeling or other such insulation abnormalities, the patient may experience electrical shock or other serious injury.
- If the inspection should result in the abnormal operation of the unit, stop its use immediately and contact your sales representative.
- The probe is a precision instrument. Always use caution when handling it. If the probe is dropped and this causes damage to the surface that comes in contact with the body, stop using it immediately and contact your sales representative. The use of a damaged probe could result in electrical shock. If the probe is used with cracks, peeling or other such abnormalities, the patient may experience electrical shock or other serious injury.

2. Protective inspections

The following inspections are required to maintain the performance and safe operation of the unit. Some of the inspections must be performed by specially trained personnel. Contact your sales representative for details.

Description of Inspection	Items Inspected	Inspection Frequency
Cleaning	Inside the unit. Covers and panels. Monitor. Probes and probe holder.	Annually
Wash & Disinfect	All parts on the main unit. Console.	Annually
Check electrical safety	Resistance of protective systems. Ground leakage current Leaking current from outside of unit. Leaking current to patient I. Leaking current to patient III. Fan	Annually
Check mechanical safety	Operating panel (touch panel). Design of peripheral equipment (connectors). Other components. Check the exterior of probes.	Annually
Record measurement results	Record wave pattern data from standard probe.	Annually

6.6 SPECIFICATIONS

[Specifications of HS-2100V]

Scanning Method	Linear/Convex Type Electronic Scanning
Number of Probe Channel	96 Channels, 128 Channels
Number of Simultaneous Drive	Transmitter : 64 Channels (Max) Receiver : 32 Channels (Max)
Operating Mode	B Mode, B/B Mode, B/M Mode, B/Z Mode, M Mode
Range	3.5MHz : 0~2-24cm (1cm Step : Adjustable) 5MHz or more : 0~2-16cm (1cm Step : Adjustable)
Focusing Method	Transmitter : 4-Level Focus Receiver : Continuous Dynamic Focus
Rated Ultrasound Frequency	1.5, 2.0, 2.8, 3.0, 3.5, 5.0, 6.0, 7.0, 7.5, 8.5, 9.0, 10.0, 11.0, 12.5MHz
Display Monitor	10.4 inch SVGA Color LCD Monitor
Acoustic Power Adjustment	20-100% (10% Step : Adjustable)
Gray Scale	256 Levels
Image Display	Up/Down, Left/Right, Positive/Negative
Image Adjustment	B-Gain : 36~100dB (1dB Step : Adjustable) M-Gain : 36~100dB (1dB Step : Adjustable) B-Dynamic Range : 35~ 95dB (1dB Step : Adjustable) M-Dynamic Range : 35~ 95dB (1dB Step : Adjustable) STC : 8-Level Slide Control γ curve Enhancement Function Soft : Off, Level 1 to 4 (Image Processing) Edge : Off, Level 1 to 3
Sweep Speed in M Mode	1/1, 1/2, 1/4, 1/8, 1/16(*) * B/M-Mode : (1/1) is 1 second per frame. * M-Mode : (1/1) is 2 seconds per frame.
Cine Memory	255 frames
Measuring Function	Distance : 8 Measurements Velocity : 4 Measurements Area/Circumference : 4 Measurements (Type: Trace/Ellipse) Volume : 2 Measurements Histogram, HR, LV, Tendon%, Fetal Age
Fetal Age Table/ Graph Display	ESD, ECD, CTD, CHL, CHD, CCRL, STD, SHD, DGSD, DCRL, DHD, DBD, cHD, cBD User table
Data Storage	Still Image (JPEG) : Internal (100 Images max.) / External USB memory Moving Image (AVI) : External USB memory
Character Display	Hospital Name (up to 40 Characters), ID Information(ID: 10 Characters, Name: 30 Characters, Age), Date, Time, Probe Type, Current Setting Information
Video Signal	Standard Video Signal (PAL or NTSC)
External I/O	USB Memory Port : 1 Channel Video Output : 2 Channels (composite video) External monitor Output : 1 Channel (Analog RGB) Foot Switch Input, Printer Remote Control Output
Power Source	100~ 240V AC $\pm$ 10%, 50/60Hz, 150VA
Dimension (Width×Depth×Height)	Approx.335 ×200 ×380 (mm) (Keyboard is closed) Approx.335 ×500 ×380 (mm) (Keyboard is opened)
Weight	Approx.11kg

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1. Adding to all or part of this manual is strictly forbidden.
 2. The contents of this manual are subject to change without future notice.
 3. Please contact your sales representative if you have any questions.
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HONDA ELECTRONICS CO.,LTD.

20 Oyamazuka, Oiwa-cho, Toyohashi, Aichi Pref., 441-3193 Japan
TEL : +81-532-41-2511
FAX : +81-532-41-2093